Technical University of Denmark

National Institute for Aquatic Resources

Danish National Programme for collection of fisheries data for 2011-2013

Updated National Programme for 2012

by

National Institute for Aquatic Resources
Danish AgriFish Agency
Institute of Food and Resource Economics
Statistics Denmark

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I.   General framework

This document presents the proposal for the Danish Nationale Programme (NP) for data collection in the fisheries sector for the years 2011-2013. The programme has been developed in accordance with the rules laid down in the *"Commission Regulation (665/2008) and Commission Decision (2010/93/EC) adopting a multi annual Community programme pursuant to Council Regulation (EC) No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy"*, hereafter referred to as "DCF" in this programme.

The format of this report is structured following the most recent guidelines from the Commission[1].The NP is structured in a number of modules. In the following chapters a description is given of the activities related to the DCF that will be carried out by Denmark.

Furthermore, the EC has established provisions to facilitate the cooperation between MS with the regard to the collection of data. These are Regional Coordination Meetings (RCM), formal (bilateral) agreements with other MS and in the future regional databases. As far as the conclusions and agreements of the meetings are relevant for the regional data collection and for Denmark they are included in the NP.

In addition to this NP a budget for the programme has been prepare. The planning of the costs is presented in separate spreadsheets in the FinForms formats as provided by the Commission.

II.   Organization of the National Programme

II.A   National organization and co-ordination

Denmark has assigned the National institute of Aquatic Resources (DTU Aqua), Technical University of Denmark (former Danish Institute for Fisheries Research) as the coordinating institute in Denmark. Jørgen Dalskov, Head of section Public Sector Consultancy, DTU Aqua has been assigned as the National Correspondent.

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[1] Guidelines for the submission of National Programme Proposals on the National Data Collection Programmes under Council Regulation (EC) 199/2008, Commission Regulation (EC) 665/2008 and Commission Decision 2010/93/EC. Version 2009

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The work in Denmark is carried out by 4 partners:

1. **National institute of Aquatic Resources (DTU Aqua)** is an institute under the Technical University of Denmark. The institute carries out research, monitoring and provides advice concerning sustainable exploitation of live marine and fresh water resources. Furthermore, the institute is responsible for providing data for ICES stock assessment work and participates in varies ICES assessment working groups, planning and expert groups as well as in the ACOM work. The institute is having a public sector consultancy contract with the Danish Ministry for Agriculture, Fisheries and Food.

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2. **Danish AgriFish Agency (FD)** works for commercial fisheries to be balanced and economically healthy, for sustainable fishing and to maintain recreational fishing. The agency is part of The Ministry of Food, Agriculture and Fisheries; it was established in its present form in 1995.

The main tasks of the agency department of fisheries are to provide service to the Minister and the political level, assist in law proposals and contribute to international negotiations. Furthermore, FD are responsible for making rules and regulations in the Danish fisheries as well as administer the Danish fishing, to inspect and control fishing activities and finally to make primary statistics on fisheries.

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3. **The Danish Food and Resource Economics Institute (FOI)** is an institute under KU Life, a faculty of life science a part of the University of Copenhagen. The Researchers and academic staff of the Institute have backgrounds and experience in economics, agricultural and resource economics, agronomy, as well as a wide range of statistical methods and applied research tools.

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4. **Statistics Denmark (DST)** The aim of the institution is to collect, process and publish statistical information on social and economic conditions. Additional DST contributes to the international statistical cooperation. Furthermore, DST is also actively involved in the statistical activities in the UN, OECD, IMF and in the Nordic countries, etc. DST is also carrying out statistical tasks for private and public customers.

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A Steering Group has been established with members from all four involved Institutes. The main objective of the Steering Group is to coordinate the work to be carried out according to the DCF.

II.B   International co-ordination and international scientific meetings

International coordination of data collection and quality issues takes place at several levels. Coordination and taks sharing within the DCF takes place between MS at a regional level in the Regional Coordination Meetings. Elements in the NP which also concern other MS, in particular related to sampling, will be dealt with by bilateral coordination and agreements with the other MS. Furthermore, the ICES Planning Group on Commercial Catches, Discards and Biological Sampling (PGCCDBS) remains responsible for coordination of the quality aspects of sampling of catches (landings and discards) and biological parameters. PGCCDBS meets annually and the meetings of this planning group will be attended. One of the key activities of PGCCDBS is to initiate workshops dealing with standardization of methods and quality of data sampling between different institutes. These groups will meet annually and will be attended by Denmark.

All surveys are coordinated internationally by ICES planning groups. The survey planning groups, which are relevant to Denmark are BIFSWG, IBTSWG, WGIPS, WGNAPES, These ICES working groups coordinate the surveys carried out in Danish NP. These groups will meet annually and will be attended by Denmark.

Coordination of economic data collection takes place in RCMs.

According to Article 10(2) of Council Reg. 665/2008, the Commission shall provide the MS with a list of meetings which are eligible for Community financial support for the expert participation in the following year. The list will be made available by the Commission around mid October. The list (Table II.B.1) will include

international coordination meetings, workshops and meetings for scientific advice. When the list is provided by the Commission it will be updated and the Danish intended participation in next year's meetings will be given.

The international scientific meetings such as stock assessment expert meetings, review groups, study groups, workshops that are dealing with species or areas relevant for the Danish fishery will have participation of Danish experts. In some of the meetings the workload are considerable as Danish experts are responsible for carrying out the stock assessment of one or more stocks, therefore more than one person will participate at the various meetings. Furthermore, Denmark holds the chairmanship on a numerous groups.

Collection of information on fishing capacity, fishing effort, economic and landings statistics are carried out entirely on a national basis. Biological information on catches, data collected by research vessels and discards data are in most cases coordinated internationally and carried out in close cooperation with research institutes in Member States and third countries.

In the economic field FOI constitutes the Danish representative in the project economic Assessment of European Fisheries organized under the Concerted Actions and Thematic Networks which is committed to develop a common method or standard for evaluation of the economic situation in the Community fisheries.

II.C   Regional co-ordination

Denmark will participate in the relevant Regional Co-ordination Meetings, namely those concerning the Baltic Sea and the North Sea & East Arctic (see Table II.B.1). If necessary for the coordination of e.g. surveys covering the North Atlantic region Denmark will participate in the RCM for the North Atlantic.

Denmark has for years made agreement on collection of biological sampling of landings or bilateral cooperation with a number of MS such as Sweden, Belgium, Germany, Ireland, the Netherlands and Scotland. It is expected that agreements with these MS as well as other MS will to be signed on a yearly basis. At the RCM's in 2010 Denmark will promote increased cooperation and task sharing between these MS as well together with other MS.

Data confidentiality issues		Danish action
RCM Baltic 2010 Recommendations	The RCM Baltic recommend that the Commission legal service assess the provision concerning data confidentially given in the DCF regulation; Council Regulation No. 199/2008, Commission Regulation No. 665/2008 and Commission Decision (2010/93/EU) or any other relevant EU legislation and that the MSs assess the legal issues in these regulation and in their national legislation. Furthermore, it is recommended that it is clarified to which extent the EU legislation is over-arching the national legislation.	Not relevant for Denmark as Danish data is and have been delivered at the level of "detailed data" as specified in Council Reg. 199/2008.

COST tool	Danish action

RCM Baltic 2010 Recommendation	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.	Denmark is supporting this recommendation and will participate in the workshop.

Fish frame 5.0 workshop in early 2011		**Danish action**
RCM Baltic 2010 Recommendation	To ensure the wide implementation of several agreed/recommended tasks, the RCM Baltic recommends that a Fish frame 5.0 workshop should be arranged in early 2011.	Denmark will act as instructor at workshop that will be held in 2012.

III. Module of evaluation of the fishing sector

III.A General description of the fishing sector

The Commissions directive for preparing a national programme according to Article 4 in Council Regulation (EC) No 199/2008 of 25 February 2008 specifies in chapter III A. Collection of economic variables that the population should be the vessels in the Community Fishing Fleet Register on the 1st of January.

The number of vessels registered for Denmark in the Community Fishing Fleet Register on the 1st of January 2008 was 2,954, of which 1,028 had no activity in 2008. The 1,926 vessels which were active during 2008 had landings of fish to a total value of EUR 287 million or 85.8 per cent of the total value of the Danish fishery in 2008. The remaining 14.2 per cent of the value of the Danish fishery in 2008, totalling EUR 47.6 million, were landed from vessels entering the register after the beginning of the year (cf. table 1).

Table 1. Active registered vessels in the Danish Fishery 2008.

	Vessels registered the whole year	Exits register during year	Enters and stay in register during year	Enters and exits during year	Active fishermen with no vessels	Total active register units
Vessel segments	------------------------------ Active registered vessels ------------------------------					
Dredgers: < 12 m	33	-	-	-	-	33
Demersal trawl and seine: < 12 m	25	2	3	1	-	31

Using polyvalent passive gears: < 12m	1,085	73	100	12	31	1,301
Using active and passive gears: < 12m	118	18	26	5	-	167
Dredgers: 12-18 m	37	0	0	0	-	37
Demersal trawl and seine: 12-18 m	155	42	37	11	-	245
Polyvalent passive gears: 12-18 m	59	9	12	1	-	81
Active and passive gears: 12-18 m	40	11	12	1	-	64
Beam trawlers (Shrimp): 12-18 m	12	4	5	1	-	22
Demersal trawl and seine: 18-24 m	66	18	15	2	-	101
Active and passive gears: 18-24 m	11	5	3	1	-	20
Beam trawlers (Shrimp): 18-24 m	14	-	2	-	-	16
Pelagic trawl and seine: 24-40 m	42	13	14	6	-	75
Pelagic trawl and seine: > 40 m	22	12	8	-	-	42
All segments	1,719	207	237	41	31	2235
Total value of landings in 1000 EUR	254,742	32,257	43,838	3,766	69	334,671
Per cent share of value of landings	76.1%	9.61%	13.1%	1.1%	0.0%	100.0%

During the year 2008 an additional 512 vessels were registered of which 278 vessels became active. So the total number of Danish vessels with landings of fish in 2008 was 2204. Many of these vessels are small boats used part time by fishermen, who have more than a single vessel at hand, and shift between one and the other dinghy depending on the work to be done (setting out poles for nets and/or traps, emptying gear, fishing for bait etc.). Also the fishery regulation system has for many years linked the right to fish a certain amount of fish to the vessel. So some fishermen have additional vessels, which are not used as separate production units, in order to keep the right to fish and ensure their income. Though all quotas today no longer are stuck to the physical vessel there are still a number of "additional or secondary" vessels registered, and some of the landings of fish are registered on those vessels. Also 31 fishermen with no vessels had (small) landings of fish.

In order to calculate the production for each fisherman and fishing firm it is necessary to identify the production unit that has been in use for the year. In most cases that is a single vessel, which has been owned and used by the same fisherman the whole year. Another situation exists when a fisherman sometime during the year shifts vessel and carry on fishery with his crew from the other vessel, or if he some months uses two vessels simultaneously like fishermen using fixed nets and traps sometimes does. In those cases the production and other economic data for each part time of the year must be added up to form a complete operating year.

After identification and combining of all part time use of small vessels and shift of vessels during the year, the number of production units (vessels) in the Danish fishery in 2008 measures 1,810 units.

615 of the 1,028 vessels that were registered at the beginning of the year, but did not become active in fisheries during the year, were owned by fishermen or fishing firms with other active vessels (cf. table 2).

Table 2. Inactive vessels registered in Denmark 2008.

	Vessels registered the whole year	Exits register during year	Enters and stay in register during year	Enters and exits register during year	Total inactive register units
Owner groups:	------------------------- Inactive registered vessels -------------------------				
Owners with active vessels < 12 m	393	63	37	58	551
Owners with active vessels 12-18 m	50	30	27	22	129
Owners with active vessels 18-24 m	28	16	14	9	67
Owners with active vessels 24-40 m	19	10	5	9	43
Owners with active vessels > 40 m	3	3	3	2	11
Owners with no active vessels	323	90	31	17	461
Total	816	212	117	117	1,262

The Danish programme for collection of economic data covers all fishing activity for the year and includes both vessels that are registered from the start of the year as well as vessels that become registered during the year and commences fishery in the year. The population of fishing units (vessels) covers therefore the whole production in the fishing sector.

The total volume of the Danish fishery in 2008 was 685,844 tonnes to a value of 334.7 million EUR. The main part of the fishery takes place in the North Sea, Skagerak/Kattegat, and the Baltic Sea, but some vessels are also fishing in the Norwegian Sea and the waters west of Ireland and Scotland. In the Danish fishery gears as trawls, Danish seines, purse seines, beam trawls, gillnets and hooks, trap nets are used.

Table 3. Value of landings in 2008 by groups of species (1000 Euro)

	Baltic Sea	North Atlantic	North Sea and Eastern Arctic	Other	Total
Crustaceans					
Common Shrimp (Crangon crangon)	0	0	12603	0	12603
Northern shrimp (Pandalus borealis)	0	5708	481	0	6189
Norway Lobster (Nephrops norvegieus)	249	23469	8514	0	32231
Other	138	391	993	0	1521
Deep water species					
Ling (Molva molva)	1	91	744	0	836
Tusk (Brosme brosme)	0	1	94	0	95
Other					
Demersal fish					
Angler (Lophius piscatorius)	3	1276	5521	0	6800
Atlantic Cod (Gadus morhua)	29869	9462	12831	0	52162
Brill (Scophthalmus rhombus)	479	647	526	0	1652
Common Dab (Limanda limanda)	839	401	569	0	1809
Common Sole (Solea solea)	1662	4829	5084	0	11575
European Eel (Anguilla anguilla)	2456	165	51	0	2672
European Hake (Merluccius merluccius)	0	1027	2377	0	3404
European Plaice (Pleuronectes platesca)	2284	13633	14213	0	30130
Haddock (Melanogrammus aeglefinus)	24	1385	643	0	2051
Lemon Sole (Microstomus kitt)	25	1203	3905	0	5132
Norway Pout (Trisopterus esmarki)	0	0	4611	0	4611
Saithe (Pollachius virens)	3	3226	4038	0	7267
Sandeel (Ammodytes dubius)	4	1672	29424	0	31099
Turbot (Psetta maxima)	678	1005	4237	0	5920
Whiting (Merlaugius merlangus)	182	38	36	0	255
Witch Flounder (Glyptocephalus cynoglossus)	1	1804	921	0	2726
Other	1394	1590	2604	1912	7499
Molluscs					
Blue Mussel (Mytilus edulis)	702	951	4122	0	5775
Other	2	143	3983	0	4128
Pelagic fish					
Atlantic Herring (Clupea batis)	2667	8304	26844	0	37816
Atlantic Horse Mackerel (Trachurus trachurus)	0	0	0	0	0
Atlantic Mackerel (Scomber scombus)	9	69	34571	5	34653
Atlantic Salmon (Salmo salon)	98	1	0	0	99

Blue Whiting (Micromsistius poutassou)	0	0	10	2548	2558
Sprat (Sprattus sprattus)	6826	1331	10857	0	19014
Other	11	1	7	369	388
Total	50604	83820	195414	4833	334670

III.B Economic variables

The Danish programme for collection of economic data by groups of vessels 2011-2013 is a continuation of the programme implemented over the previous years. Nevertheless the data collection system has been customized to the changing circumstances in the fishing industry.

A new fishery management scheme has been implemented in the Danish fishery from 2007. Now all commercial fishing vessels have individual %-share of the quotas of all quota species. The individual quota shares can be leased out or swapped between the vessel owners, who also can establish joint companies in order to catch their accumulated quota share at lower expenses. The new management system has caused adjustments in the fleet structure.

Also the database system for the account statistics must undergo changes to ensure an appropriate flexible handling of the accounts in the succeeding years.

III.B.1 Data acquisition
(a) Definition of variables

The variables or "economic indicators" in the DCR report are aggregates of several detailed variables in the Danish fishery account system. All variables are collected in the individual accounts and aggregated to the specifications in the Commissions directive for preparing national programmes according to Article 4 in Council Regulation (EC) No 199/2008 of 25 February 2008

Income (Turnover, Structural Business Statistics (SBS) 12 11 0):

- *Gross value of landings.*
- *Income from leasing out quota or other fishing rights.*
- *Direct subsidies (Danish fishermen are free of paying fuel duties; therefore they do not get refunds for paid duty on fuel).*
- *Other income.*

Production costs:

- *Personnel cost (include social cost):* wages and salaries to all employees (SBS 13 31 0).
- *Imputed value of unpaid labour:* calculation of value of owner's work, if not registered. The calculation uses the average hourly pay rate for process- and machine operators including nuisance bonus from the Confederation of Danish Employers structural statistics. For the year 2008 the rate was 223 DKK (= 29.91 EUR) per hour (SBS 12 32 0).
- *Energy costs:* fuel costs excl. duties and bonus/discount (SBS 20 11 0).
- *Repair and maintenance costs:* maintenance of all physical fishing assets (SBS 13 11 0).

- *Other operational costs:* assembled into variable and non-variable costs plus lease/rental payments for quota or other fishing rights (SBS 13 11 0).

Capital costs: depreciation (use of capital) and net interest expenditure (cost of financing capital).

Capital value:

- *Replacement value or historical value of physical capital.*

- *Value of quota and other fishing rights.*

Investments: purchase of physical capital (net) and improvement which prolong the service life of physical capital (SBS 15 11 0).

Financial position (debt/asset ratio): debt as a percentage of total assets (end of year).

Employment:

- *Engaged crew:* Number of jobs (average number of persons working for and paid by the fisherman/fishing firm.
- *FTE national:* Calculated using national threshold rate.
- *FTE harmonized:* Calculated using 2,000 hour rate.

Fleet:

- *Number of fishery units (vessels).*
- *LOA:* Average over all length for vessels in the fleet segment.
- *GT:* Average gross tonnage for the vessels in the fleet segment.
- *KW:* Average engine power (kilowatt) for the vessels in the fleet segment.
- *Age:* Average age of vessels in the fleet segment.

Effort:

- *Vessel days at sea.*
- *Energy consumption (fuel quantity in litres).*

Fishing enterprises (situation at the 1st of January):

- *Number of enterprises with one registered fishing vessel.*
- *Number of enterprises with 2-5 registered fishing vessels.*
- *Number of enterprises with more than 5 registered fishing vessels.*

Production value per species:

- *Value of landings per species:* first hand sale.
- *Average price per species:* prices in EUR per kilo live weight.

(b) Type of data collection

The Danish programme will be completed by two sources of data. The first being data from the administrative and statistical registers of the Directorate of Fisheries (FD) and the second data from sample statistics compiled at Statistics Denmark (DST).

Register data are type (A) Census.

Data from accounting forms are type (C) Non-Probability Sample Survey.

(c) Target and frame population

As every landing of fish is registered the total or TARGET population will include vessel units with landings of only a few fish like for instance sideline fishermen. These units have to be separated, because it is completely unrealistic to get solid information about costs from these part-time/leisure fishermen, as they are not setting up yearly accounts. Instead of using the accounting form in these cases, the exhaustive data on production, revenue, equipment and capacity are used to calculate a costs estimate based on the parameters for similar vessels/fishery.

The TARGET population covers all fishing activity from Danish fishing vessels during the year. The vessels registered for Denmark in the Community Fishing Fleet Register on the 1st of January covers only 85.8% of the value of the Danish fishery (in 2008) as shown in table 1 above.

The FRAME population exclude the non-commercial or part-time fishermen and cut off the population to include only active vessels with total revenue for the year at less that EUR 33,020 (DK threshold for 2009). The main differences between the figures in the DCR-reports and the Danish statistics will be in the groups of vessels less that 12 metres using polyvalent gear or passive polyvalent gear (netters).

All data on the accounting form refers to a "fishery unit" defined as a Fisherman or Fishing firm with one separately operating vessel that is a vessel which is active in fishery and has its own separate crew. When a Fisherman or Fishing firm owns more than one separately operating vessel, the account for that economic agent is split into separate accounts for each fishery unit.

(d) Data sources

The administrative and statistical registers in FD are the basic source to information about the Danish fishery. The registers relevant to the collection of economic information for groups of vessels are: the Register of Fishing Vessels, the Register of Fishermen/Vessel Owners, the Sales Note Register and the Logbook Register. These registers are fully comprehensive in the sense that all fisheries related activities are registered for all individuals, which means that statistical analysis based on the registers can cover all activities in the fishery and on the first-hand market for fish (e.g. the official fishery statistics).

Cost data, financial information and information on factor input like fuel consumption and labour input are not registered in the FD's register. These data are collected by DST on the yearly accounting forms.

(e) Sampling stratification and allocation scheme

DST obtains each year an extract from the FD registers containing information on all active vessels for the year before. This extract is used to analyse and stratify the population of fishery units before the sample for the year is drawn. The population is stratified according to the fleet segmentation laid out in the Commission Decision 2008/949/EC together with additional national length groups and economic size groups.

The possibility of stratification on economic size groups is an important cornerstone for the statistical sampling. It can only be done because Denmark has a total registration by economic agent (and fishing vessel) of all landings of fish intended for the market, which includes landings from both commercial and non-commercial fishermen. Only own consumption of fish is not registered. The Danish Tax authorities set rules for calculating the use of own production which also includes fishery products, and these rules are also applied to the Account Statistics for Fishery whereas the estimated own consumption of fish is added to the production in the individual accounts.

Only authorized persons can legally buy and sell fish on the first hand market. The authorized first hand purchasers of fish report daily the registered landings of fish to the Directorate of Fisheries. The cost of having this exhaustive registration of all landings of fish is not a part of this national data collection program, and the data necessary for setting up the population of fishermen/fishing firms for the completion of the DCR has so far been delivered each year free of charge.

Having full knowledge of the yearly revenue (per species) of each individual vessel unit in the population makes it possible to stratify the entire population according to fleet segmentation and economic size groups and calculate an optimal sample size for each stratum. The optimal sample sizes are calculated in order to minimize the variances on the economic variables. Therefore the sample size varies from 12 per cent of the units with small revenue to 45 per cent of the units with high revenue.

For each stratum the sample is drawn randomly from a selection of fishermen/fishing firms who have beforehand agreed to participate. This method ensures that there are nearly no non-response in contrast to common random sampling, where non-response is a grave problem and often causes bias in the sample. If for some reason an account from any of the sampled units cannot be collected, that unit is replaced with a substitute from the same stratum. Finally based on our knowledge of the production of each vessel unit in the population we improve the sample by including all units (100%) for some important strata like beam trawl and purse seine.

The necessary sample size will be about 250-300 accounts, though it cannot be estimated before the actual population has been surveyed, and that is scheduled to March/April the year after the fishing year when all data has been processed on the FD registers.

III.B.2 Estimation

Full knowledge of many variables for the total population has the effect that the weighting system is able to rectify for most of the sample uncertainty. The calculation of the economic variables is done in a goal

programming model with restrictions on the number of units and the known production of each species for each stratum, groups of strata and the entire population.

The method is similar to the method used for many years for the sampling of accounts for the FADN statistics to the DG Agriculture.

III.B.3 Data quality evaluation

The coherent structure of economic data makes it necessary to be able to validate all variables for each individual economic agent both in detail and consistently combined with other variables. The best way to do that is by setting up a balanced account. Therefore DST uses a harmonized accounting form for fishery, which ensures that the data is broken down to meet the requirements of the Account Statistics for Fishery as well as the specifications in Commission Decision 2010/93/EC.

In order to ensure an adequate data quality DST is collecting data from the fisherman's professional accountants. Furthermore there are several steps taken to achieve the best possible measures for the economic data.

- A full balanced accounting form to ensure, that the data on the individual level is 100% correct.
- A beforehand obtained consent from the fishermen to allow their accountants to report all necessary data to avoid participation from a biased population of fishermen.
- Co-operation from professional accountants to achieve the best possible harmonized data.
- Full knowledge of the fishing activity of each individual vessel and fisherman.
- Make use of actual fishing activity in the selection process and the weighting scheme and thereby avoid miscalculation and vaporous estimates.
- Improving the calculations by using full scale survey for specific fleet segments like purse seine and beam trawlers.
- Taking substitutes that match the categorization criteria when a selected fishery unit (vessel) has to be cancelled (less than 4% of the selected sample).
- Calculating statistical weights for each account in the sample by using known measures of vessel activity for row and column aggregates in the categorization matrix as targets in a quadratic goal programming model.

III.B.4 Data presentation

Data for the year 2010 will be available in December 2011. The following years will be available with a time lag of one year with respect to the reference year.

III.B.5 Regional coordination

DST expects to participate in the North Sea and the Baltic Sea RCM's when items concerning the collection and use of economic data for fisheries are on the agenda.

No economic issues were taken up at neither the RCM Baltic nor the RCM NS&EA

III.B.6 Derogations and non-conformities

No derogations or non-conformities are expected for the 2011-2013 programmes.

III.C Biological - métier-related variables

BALTIC SEA

III.C.1   Data acquisition

Primary data collected under the Danish programme will be stored in the following databases:

i.   Vessel register. Data on fishing capacity. (FD)

ii.   Logbook database. Data on origin of catches and on effort. (FD)

iii.   Sales notes database. Data on quantities landed and prices. (FD)

iv.   Species composition database. Data on species composition in landings for industrial purposes. (FD)

v.   Biological database. Data on discards and biological parameters. (DTU Aqua)

In order, for the three involved institutes (DTU Aqua, FOI and DST), to use the same primary data on capacity, effort, and geographical distribution of the origin of the landings a common database will be produced every year, the Danish Fisheries Analyses Database (DFAD) by DTU Aqua. This database is containing data from the

register on Danish fishing vessels, Danish logbook information, the catch area declarations database together with data from the Danish sales notes database. As the data from these databases are merged it is possible to categorise each landing in one fleet segment, in one fishery etc. This database contains most of the information requested in research projects and in relation to fisheries management. The DFAD is quarterly and yearly updated. The design and development of the database is made in a co-operation between the three above mentioned institutes.

(a) Codification and naming convention

The fishing gear codes used for codification and naming includes more codes than agreed by the RCM's. The following steps have been used when metier definition has been made:

1. For each trip Level 1, Level 2, Level 3 and Level 4 of the metriér matrix is stated according to the gear used in the logbook.

2. For each trip the DFAD information (where logbook and sales slip information is merged) is used to rank the species by landed value. The step is used to determine Level 5 of the metier matrix.

3. Gear mesh size and sorting devise is used to determine metriér matrix Level 6.

Trips without match of sales slips and logbooks are omitted from the ranking as information to assign these trips to level 6 is not available. Furthermore, for vessels with loa (length over all) of less than 8 m. no logbook information is available. These trips have been characterized as "Trips out of matrix".

For some logbooks information is not adequate or missing e.g. missing mesh size and it is therefore not possible to assign these trips to level 6 of the matrix. These trips are categorized as "Trips out of matrix". The total landings of "Trips out of matrix" are less than 2% of the total Danish landings from the Baltic.

If fishing ground/area changed within trip, then effort (days_at_sea) per trip has been weighted within fishing grounds/areas by catch size of all species.

It should be mentioned when ranking the landed value by species (step 2), no "mixed cephalopods and demersal fish" for Level 5 is used by Denmark.

(b) Selection of metier to sample

Information from the DFAD data base has been used to define the metiers to sample and the variables concerning metriér matrix Level 1-6. Selection of métiers based on effort, landings and value is based on data stored in the DFAD. Target species is defined as the species contributing most to the value per trip.

 Outcome of ranking the Danish fishery in the Baltic region is given in Table III.C.1. The metiérs to be sampled and metiérs to be grouped is given in Table III.C.3.

Even though a metiér according to the ranking guidelines has been selected to be sampled, not all metiérs meeting these criteria have been sampled. Reasons for deviation of the guidelines are given in section III.C.6.

The small scale fishery is included in the Danish sampling frame for all harbour sampling, however discard sampling is not conducted in vessels smaller than 10 meters, due to space, safety and logistic challenges.

In Commission Decision EC/2010/93 there is a requirement to sample twin trawler (OTT) and bottom trawlers (OTB) as two different meiters. In the main part of the logbooks fishermen writes OTB when it should be OTT, however, until 2011 OTT was not a mandatory gear to write in the Danish logbook and therefore OTT and OTB have as a standard been merged in all Danish waters. OTT is very seldom selected for sampling according to the ranking system, however in reality this gear is probably more used than the OTB.

In 2010 the regulation for the Bacoma sorting grid increased from 110 to 120 mm in the exit window. Therefore these two metiers have been merged in the text and tables.

The same problem seems to occur between the GNS and GTR were the fishermen are writing GN for both gears. These two metiers have therefore also been merged in all Danish waters.

In 2011 all 91 different Danish metiers were analysed for similarities in landing patterns and distribution in time and space. Due to this large analysis some of the merged metiers were regrouped. In the following section a argumentation for the merging has been put forward.

species			
	Atlantic Cod - Gadus morhua		Atlantic Herring - Clupea harengus
	Atlantic Horsemackerel - Trachurus trachurus		Atlantic Mackerel - Scomber scombrus
	Atlantic Salmon - Salmo salar		Blue Whiting - Micromesistius poutassou
	Boarfish - Capros aper		Brill - Scophthalmus rhombus
	Common Dab - Limanda limanda		Common Shrimp - Crangon crangon
	Common Sole - Solea solea		European Eel - Anguilla anguilla
	European Flounder - Platichthys flesus		European Hake - Merluccius merluccius
	European Plaice - Pleuronectes platessa		Garfish - Belone belone
	Grey Gurnard - Eutrigla gurnardus		Haddock - Melanogrammus aeglefinus
	Lemon Sole - Microstomus kitt		Ling - Molva molva
	Monk - Lophius piscatorius		North Deepwater Prawn - Pandalus borealis
	Norway Lobster - Nephrops norvegicus		Norway Pout - Trisopterus esmarkii
	Other		Pollack - Pollachius pollachius
	Saithe - Pollachius virens		Sandeel - Ammodytidae sp.
	Sprat - Sprattus sprattus		Turbot - Psetta maxima
	Whiting - Merlangius merlangus		Witch Flounder - Glyptocephalus cynoglossus

Fishing ground 22-24

Trawl fisheries targeting small pelagic fish (PTM_SPF_16-31_0_0)

In 2008-2010 the total annual landing in weight from the metier was nearly exclusive sprat (99%).The majority of the landings are for industrial purposes but there are also landings for human consumption. The total landings in this metier were in average for the three years 4,400 t. The fisheries are conducted all year around but are less intense during summer. The metier is merged with 2 other lesser important fishery (in landed t) however very similar in catch composition;

- PTB_SPF_16-31 (1,890t. 99% sprat) and
- OTM_SPF_16-31 (210 t. 100% sprat).

The metier has not been included in the sea sampling programme as the discard rates are estimated to be below 10%. The metier is concurrently sampled in harbours/at markets by purchasing unsorted samples
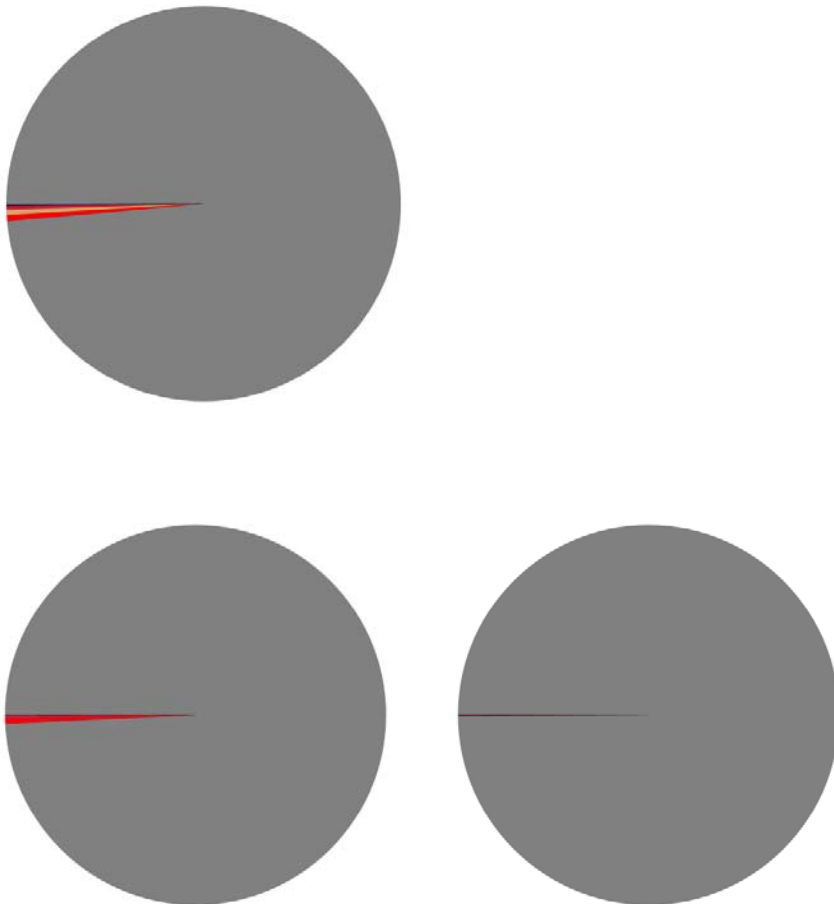
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTM_SPF_16-31 (top), PTB_SPF_16-32 (left) and OTM_SPF_16-31 (right).

Bottom trawl fisheries targeting demersal fish (OTB_DEF_>=105_1_120)

The bottom trawl fishery targeting demersal fish in subdivision 22-24 is a cod fishery with some flat fishes as by-catches. In some periods of the year the flatfishes can have a large importance for the fishery, however, western Baltic cod is the main target species. In 2008-2010 the average total landings in weight from this metier were 73% cod, 10% plaice, 6% dab, 8% flounders and 3 % of the total average catch was from other species. The total average landing amounted to 6,730t. The fishery predominantly takes place in subdivision 22 and 24. However, in the northern part of SD 23 has until 2009 had a large importance for a directed cod fishery in the first three month of the year. Since January 2009 a bilateral agreement between Denmark and Sweden has closed this area of SD 23 were trawling were conducted in February and March. The fisheries are managed in accordance with the Management plan for Baltic Sea cod (1098/2007) which includes a closed season during April. The metier is also limited by allowed number of days at sea in accordance with the TAC regulation (1404/2007 annex II). Denmark practices temporal closures on a national basis to fulfil the effort limitation in the regulation. The majority of the fisheries are conducted with otter bottom trawls even though some fishermen are using Danish Seine. The exploitation pattern and catch composition of the gear is similar with;

- SDN_DEF_>=105_1_120 (760t. 92% cod, 5% dab and 3% others)
- OTM_DEF_>=105_1_120 (20t. 87% cod and 10% plaice)
- PTB_DEF_>=105_1_120 (120t. 90% cod and 5% plaice).

The metier has been included in the sea-sampling programme since the mid 1990s. Discard rates of cod fluctuate between years but the overall discard rate is at present estimated to be around 10%. The metier is sampled concurrently at sea throughout the fishing season mainly in the 1st and 4th quarter.

Relative landing patterns by species (red colour = cod, green = dab and light blue= plaice) for the metier OTB_DEF_105_1_120 (left) and SDN_ DEF_105_1_120 (right).
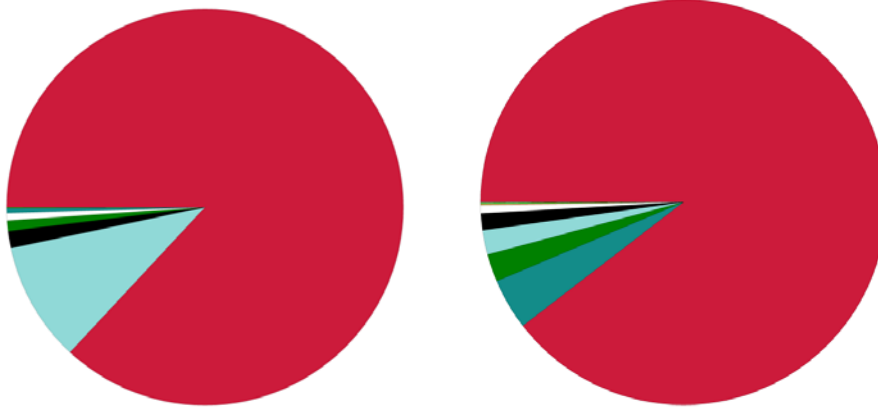
Relative landing patterns by species (red colour = cod, green = dab and light blue= plaice) for the metier OTM_DEF_105_1_120 (left) and PTB_ DEF_105_1_120 (right).

Trawl fisheries targeting small pelagic fish (PTM_SPF_32-89_0_0)

In 2008-2010 The total average landing amounted to 2,230t with herring as the main target species, 73% in weight and 26% sprat, and 1% was other species. The majority of the landings are for human consumption but there are also landings for industrial purposes. The fisheries are conducted all year around but are less intense during summer. The majority of the catches are taken by pair trawlers using a mesh size of 32-89 mm. However, to some extent other trawls and mesh sizes are used within the fisheries and the exploitation pattern and catch composition of the gears is similar. The metier is merged with;

- PTM_SPF_32-104 (646t. 85% herring, 15% sprat),
- PTB_SPF_32-89 (1,760t. 88% herring, 11% sprat and 1% other species),
- PTB_SPF_32-104 (1,200t. 91% herring, 8% sprat and 2% other species),
- OTB_SPF_32_89 (520t. 86% herring, 14% sprat), and
- OTB_SPF_32_104 (170t. 90% herring, 10% sprat).
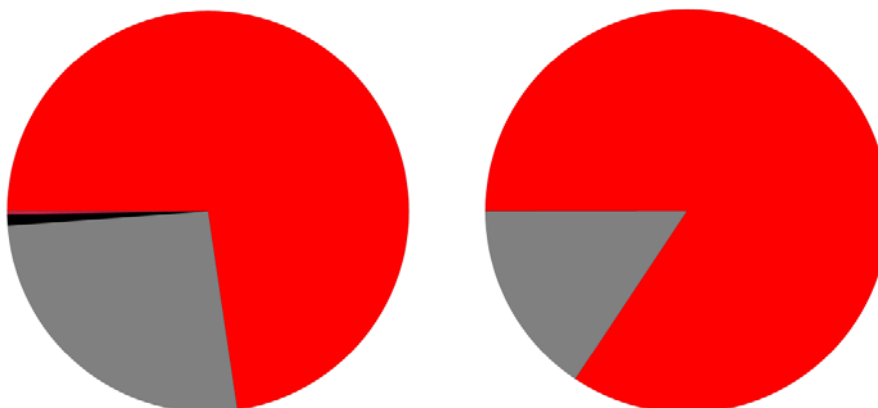
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTM_SPF_32-89 (left) and PTM_SPF_32-104 (right)
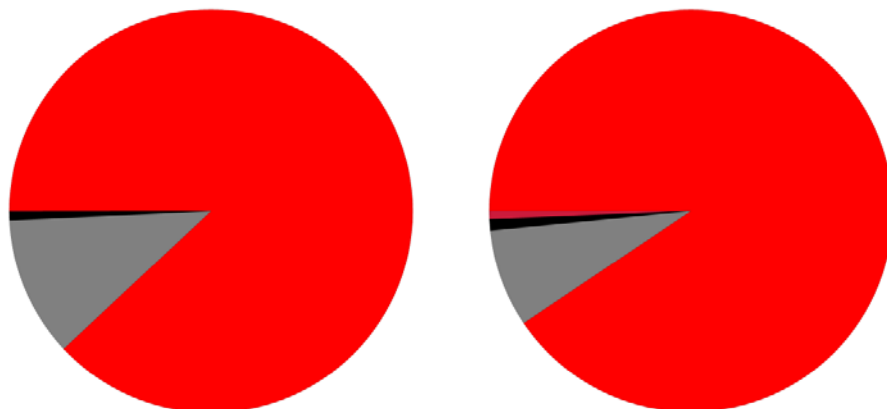
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTB_SPF_32-89 (left) and PTB_SPF_32-104 (right).
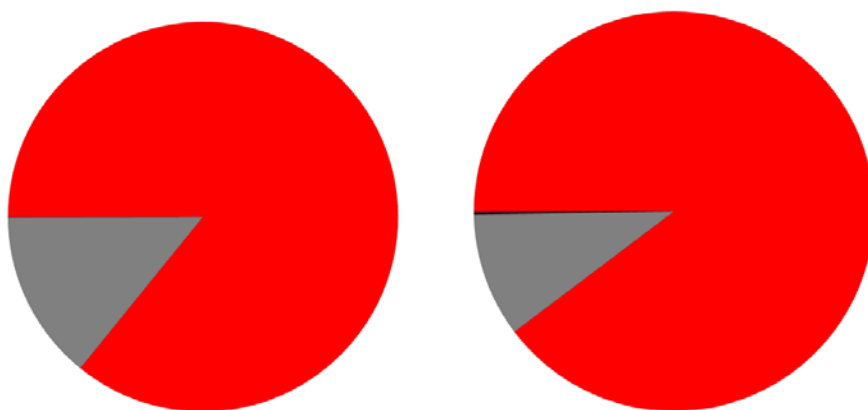
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier OTB_SPF_32-89 (left) and OTB_SPF_32-104 (right).

Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around in the main subdivision (24).

Bottom trawl fisheries targeting demersal fish (OTB_DEF_90-104_0_0)
In 2008-2010 the total average annual landings in this metier were 170t. The fishery is a mixed fishery mainly targeting flatfish. Landings were mainly conducted of plaice, flounders and sole with 32, 21 and 21%, of the weight respectively, but also other spices are of importance in this fishery: 11% dab, 9% cod, 3 % brill, 2% turbot and other species conducted 1% of the total catch. To some extent other trawls and mesh sizes are used within the fisheries and the exploitation pattern and catch composition of the gears is similar. The metier is merged with;

- PTB_DEF_90-104 (<2t. plaice, flounders and sole with 33, 19 and 27%, of the weight respectively, but also other spices are of importance in this fishery: 6% dab, 5% cod, 2% haddock, 6 % brill, and other species conducted 2% of the total catch)

The metier has not been included in the at-sea sampling programme in 2011 as the discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
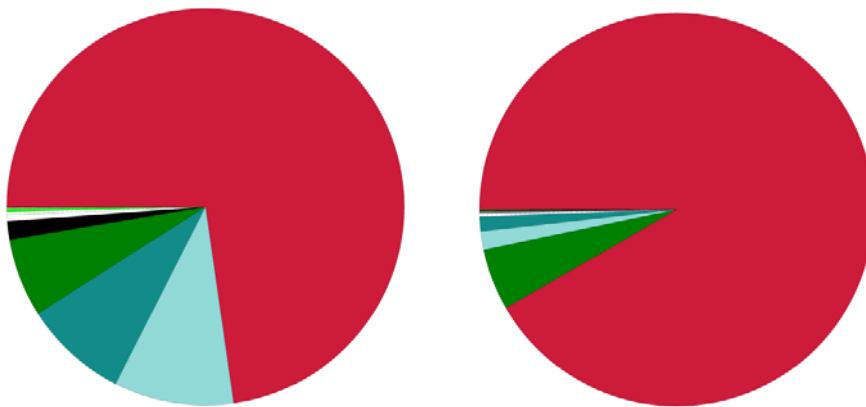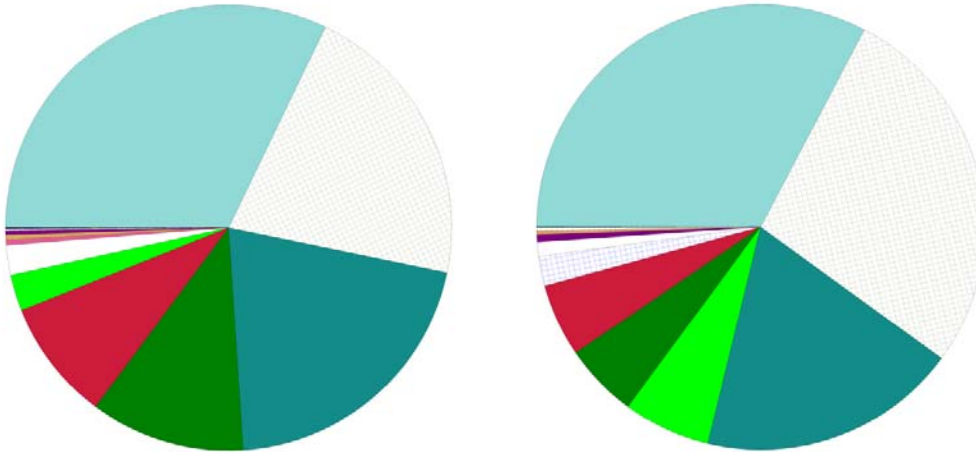

. Relative landing patterns by species (light blue colour = plaice, white check pattern= sole and dark blue = flounder) for the metier OTB_DEF_90_104 (left) and PTB_ DEF_90_104 (right).
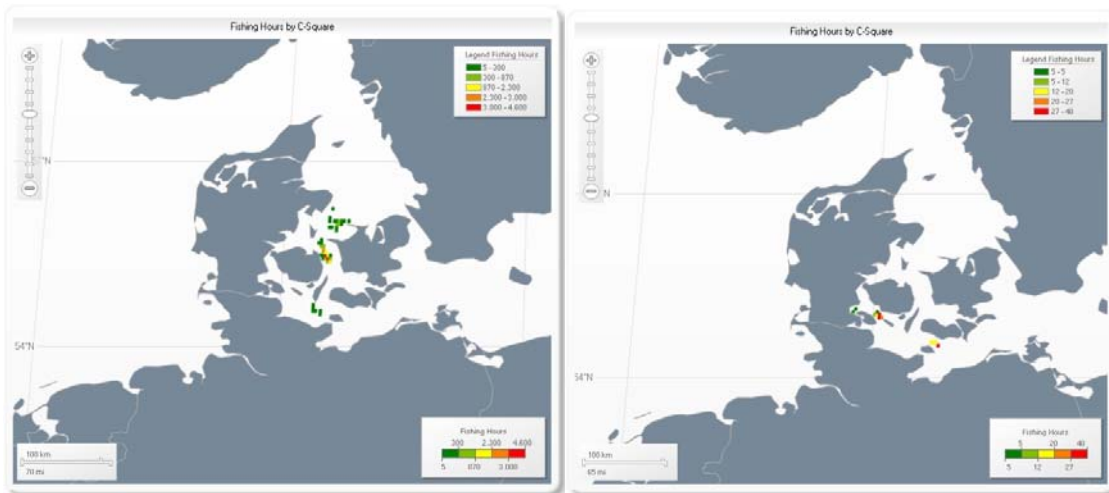
. Danish VMS signals for the metier OTB_DEF_ 90-104 (left) and PTB_DEF_90-104 (right).

Set gillnet fisheries targeting demersal fish (GNS_DEF_110-156_0_0)
In 2008-2010 the total average annual landing in this metier were 2,120 t. The catch composition for this metier were mainly cod composing of 62% of the total landing weight, 14% plaice, 11% flounder, 5% dab, 3% sole and

other species conducted 5% of the total catch. The Danish fisheries take place in subdivision 22, 23 and 24. The fisheries are managed in accordance with the Management plan for Baltic Sea cod (1098/2007) which includes a closed season (April) during the spawning season. The metier is also limited by allowed number of days at sea in accordance with the TAC regulation (1404/2007 annex II). Denmark practices temporal closures on a national basis to fulfil the effort limitation in the regulation.

A mixture of set gillnets and trammel nets are used within the fisheries and the exploitation pattern and catch composition of the gears is the similar. The metiers;

- GNS_DEF_>=157 (994 t. 64% cod, 14% plaice, 6% flounder, 5% turbot, 5% dab, 5% sole, 2% brill and other species conducted 3% of the total catch),

are thereby merged.
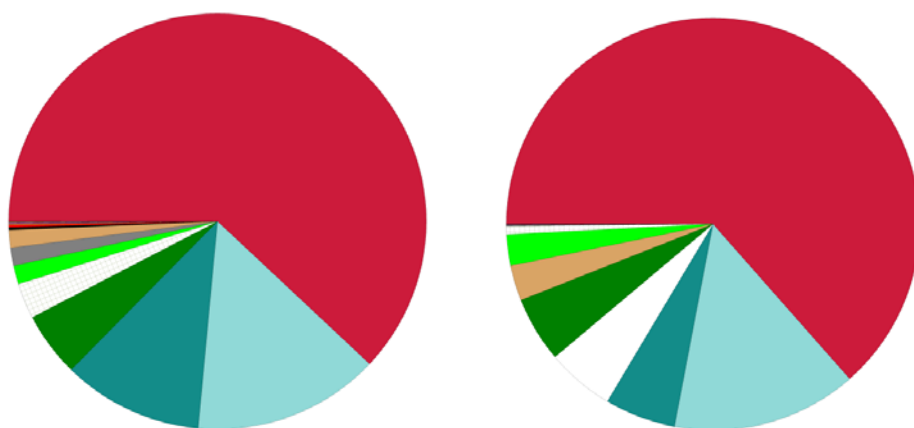
Relative landing patterns by species (red colour=cod, light blue colour= plaice and blue= flounder) for the metier GNS_DEF_>=110-156 (left) and GNS_DEF_>=157 (right).

The discard rate was estimated to be below 10%. The metier will be sampled concurrently at harbours (markets) throughout the main fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Pound net fisheries targeting catadromous species (FPN_MDC_>0_0_0)
This fishery targets silver eel in the early phase of their migration towards the spawning grounds in the Sargasso Sea. It is the basis of small scale coastal fisheries in many areas along the Danish coast in ICES subdivisions 22, 23 and 24. The total annual landings in this fishery in 2007-2008 amounted to 265 t with 97% silver ell and 3 % yellow ell. It is a seasonal fishery, starting in August. And end in late 27 and in October-November. A seasonal span from summer to late autumn reflects plausible differences in the composition of by-catches and discards. Discards are estimated to be very variable but as the gear offers a very high survival rate for un-wanted by-

cashes no discard sampling is conducted in the metier. The métier will be sampled using Non-Probability Sample Surveys, as the main objective is to collect data on length- and age composition of silver eel in a way that represents the major part of the migrating season in each area. The metier with similar the exploitation pattern and catch composition are merged FPN_CAT_>0_0_0 are by far the most important metier in this group, FPN_DEF_>0_0_0 (81 t. 70% cod, 12% flounder and 4% silver ell) and FPN_SPF_>0_0_0 (283 t. 78% garfish, 12% herring, 2% silver ell and 2% cod)

Trawl fisheries targeting small demersal fish (PTM_DEF<16) Fishing ground 22-24

In 2011 a new, although very small fishery developed in the western Baltic targeting sandell. At present only 2 vessles are havinga directed fishery towards the sandell in this area.

- PTM_DEF_<16 (183t. consisting of 100% sandell).
- PTB_DEF_<16 (70t. consisting of 99% sandell).
- OTB_DEF_<16 (60t. consisting of 99% sandell).
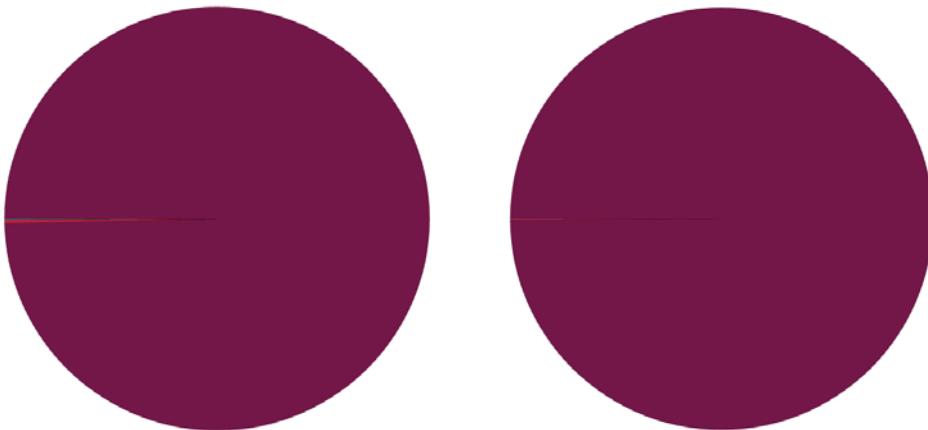
 Relative landing patterns by species (purple colour = sandell) for the metier OTB_DEF_<16_0_0 (left) and PTB_DEF_<16_0_0 (right).
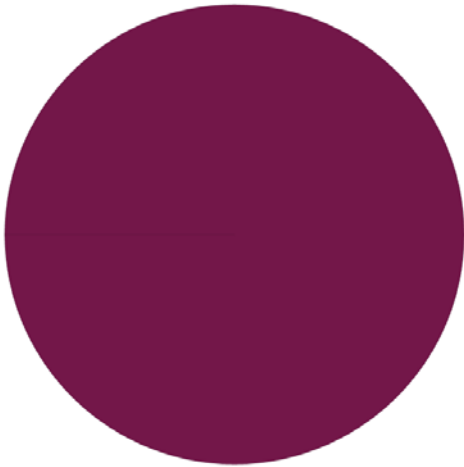
Relative landing patterns by species (purple colour = sandell) for the metier PTM_DEF_<16_0_0

Fishing ground 25-32

Trawl fisheries targeting small pelagic fish (PTM_SPF_16-104_0_0)
In 2008-2010 the total annual landing from the metier was nearly exclusive sprat (100%). The majority of the landings are for industrial purposes but there are also landings for human consumption. The total amounts for this metier were in average for the three years 18,220 t. The fisheries are conducted all year around but are less intense during summer. Other trawls and mesh sizes are used within the fisheries and the metier is merged with;

- PTM_SPF_16-31 (15,350t. 100% sprat),
- OTM_SPF_16-31 (5,020t. 100 % sprat),
- OTM_SPF_16-104 (1,450t. 100 % sprat),
- PTB_SPF_16-31 (1,190t. 99% sprat), and
- PTB_SPF_16-104 (770t. 100% sprat)

all metiers have a similar exploitation pattern and catch composition.
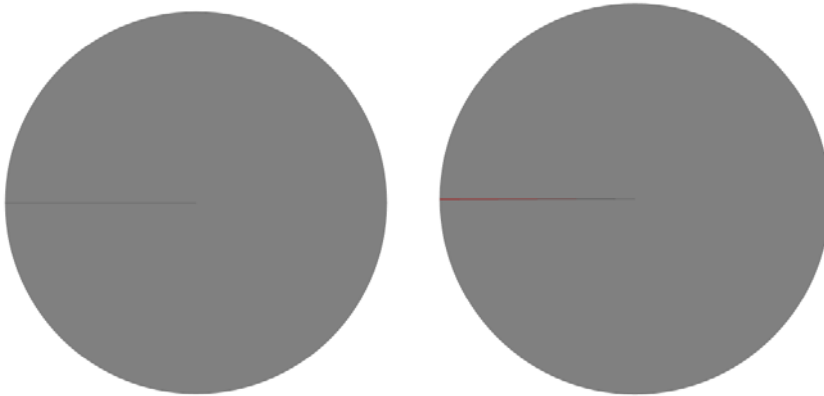
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTM_SPF_16-104 (left) and PTM_SPF_16-31 (right).
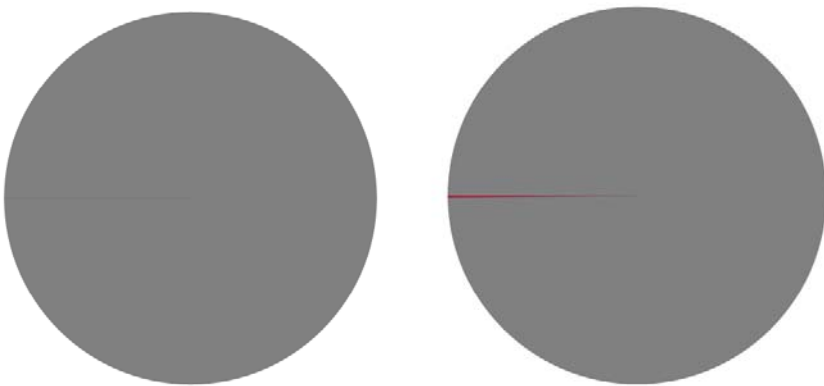
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier OTM_SPF_16-104 (left) and OTM_SPF_16-31 (right).
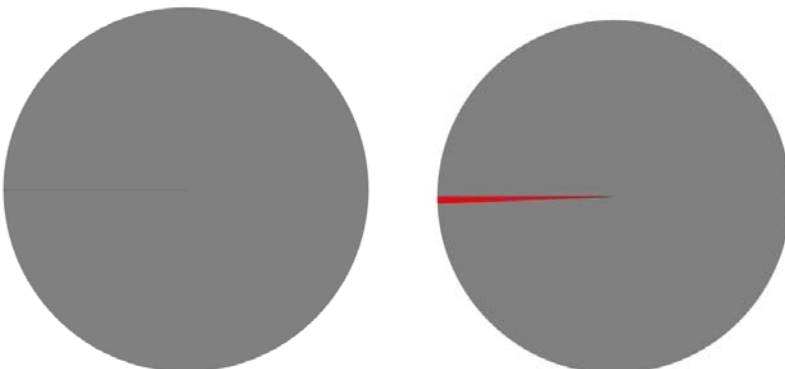
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTB_SPF_16-104 and PTB_SPF_16-31.

The metier has not been included in the sea sampling programme as the discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Bottom trawl fisheries targeting demersal fish (OTB_DEF_>=105_1_120)

The bottom trawl fishery targeting demersal fish in subdivision 25-32 is almost exclusively a cod fishery, exploiting the eastern Baltic cod stock. In 2010 the mesh size in the BACOMA window was increased from 110mm to 120 mm. In 2008-2010 the average total landings in from this metier were 93% cod and 3% from plaice and flounders, respectively. The total landings this metier was in average amounting to 7,900t. The Danish fishery predominantly takes place in subdivision 25. The fisheries are managed in accordance with the Management plan for Baltic Sea cod (1098/2007) which includes a closed season during July-August. The metier is also limited by allowed number of days at sea in accordance with the TAC regulation (1404/2007 annex II). Denmark practices temporal closures on a national basis to fulfil the effort limitation in the regulation. The majority of the fisheries are conducted with otter bottom trawls. Other trawls and mesh sizes are used within the fisheries. The metier;

- OTM_DEF_>=105_1_120 (52t. 98% cod) and,
- PTM_DEF_>=105_1_120 (<3t. 99% cod) and,
- PTB_DEF_>=105_1_120 (230t. 99% cod)

have a similar exploitation pattern and catch composition and are therefore merged.

This metier has been included in the sea-sampling programme since the mid 1990s. Discard rates of cod fluctuate between years but the overall discard rate is estimated to be above 10%. The metier will be sampled concurrently at sea throughout the fishing season mainly in the 1st and 4th quarter.
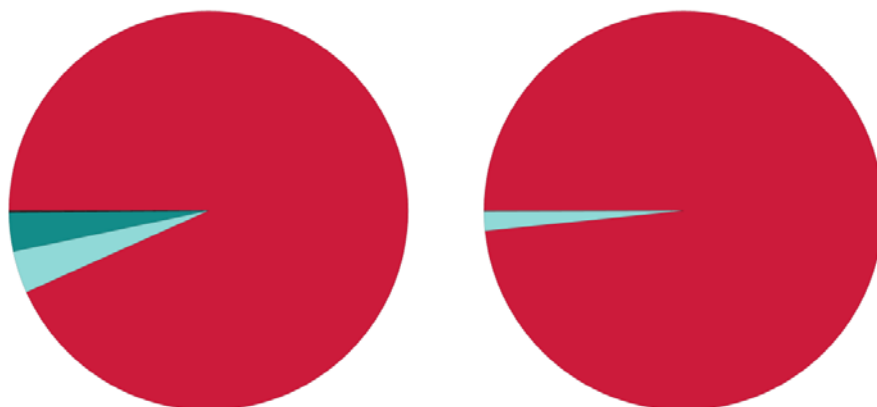
Relative landing patterns by species (red colour = cod, grey= flounder and light blue= plaice) for the metier OTB_DEF_105_1_120 (left) and OTM_ DEF_105_1_120 (right).
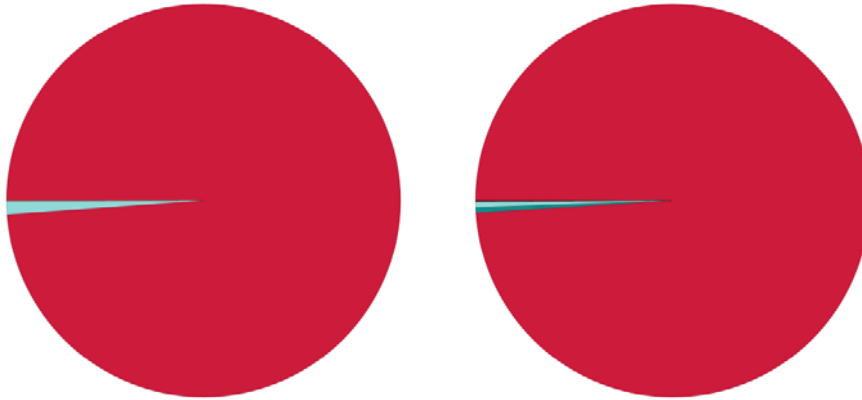
Relative landing patterns by species (red colour = cod and light blue= plaice) for the metier PTM_DEF_105_1_120 (left) and PTB_ DEF_105_1_120 (right).

Set gillnet fisheries targeting demersal fish (GNS_DEF_110-156_0_0)

Between 2008 and 2010 the average of the total landing from the metier accounted for 720t. of which 93% derived from cod, 3% from plaice and 4% from flounders. The Danish fisheries predominantly take place in subdivision 25. The fisheries are managed in accordance with the Management plan for Baltic Sea cod (1098/2007) which includes a closed season (July-August) during the spawning season. The metier is limited by allowed number of days at sea in accordance with the TAC regulation (1404/2007 annex II). Denmark practices temporal closures on a national basis to fulfil the effort limitation in the regulation. The metier is at present not included in the sea-sampling programme as the discard rate has been estimated to be below 10%. The metier will be sampled concurrently in harbours (markets) throughout the main fishing season. The fisheries are conducted with a mixture of set gillnets with different mesh sizes. The metiers;

- GNS_DEF_>=157, composed of 67% cod, 22% and plaice 6% flounders (total average catch 94t)

have a similar exploitation pattern and catch composition are thereby merged.
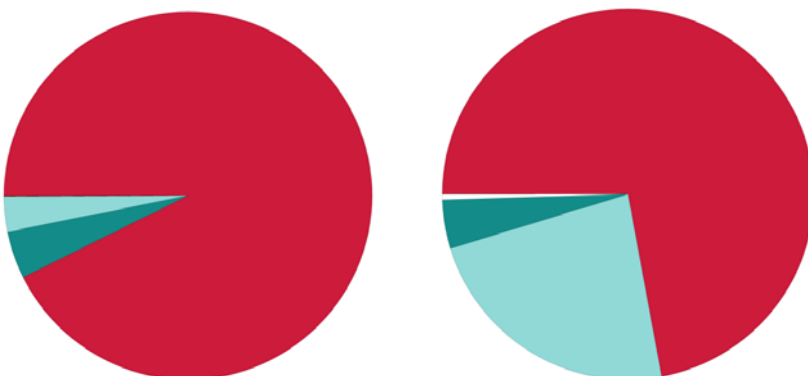
Relative landing patterns by species (red colour=cod, light blue colour= plaice and blue= flounder) for the metier GNS_DEF_>=110-156 (left) and GNS_DEF_>=157 (right).

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The metier is at present not included in the sea-sampling programme as the discard rate has been estimated to be below 10%. The metier will be sampled concurrently in harbours (markets) throughout the main fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Longline fisheries targeting demersal fish (LLS_DEF_0_0_0)

In 2008-2010 the total average landings were 125 t. The landings consist of 100 % cod in weight. The Danish fisheries predominantly take place in subdivision 25. The fisheries are managed in accordance with the Management plan for Baltic Sea cod (1098/2007) which includes a closed season (July-August) during the spawning season. A limited fishery (5 days a month) is allowed for vessels below 12 meters during the closed season. The metier is limited by allowed number of days at sea in accordance with the TAC regulation (1404/2007 annex II). Denmark practices temporal closures on a national basis to fulfil the effort limitation in the regulation.
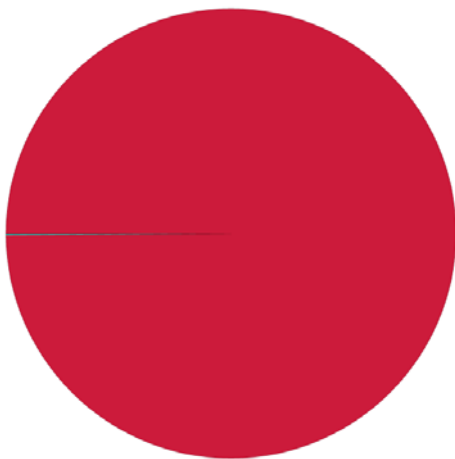
Relative landing patterns by species (red colour=cod) for the metier LLS_DEF_0.

The discard rate has been estimated to be below 10%. The metier will be sampled concurrently in harbours (markets) throughout the main fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Longline fisheries targeting salmon fish (LLD_ANA_0) Fishing ground 25-32

In 2008-2010 the total average landings were 51 t. The landings consist of 98% salmon and 2% other species in weight. The Danish fisheries predominantly take place in subdivision 25 in a very short time period in the spring.
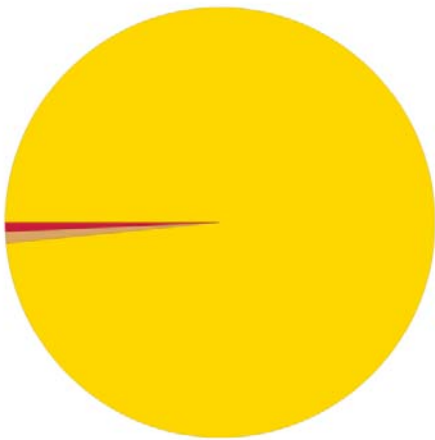
This metier has been included in the sea-sampling programme in 2011. The metier will be sampled only in 1st quarter.

(c) Type of data collection

Stock specific sampling based on commercial size categories
In Denmark all landings are registered and recorded – meaning census data on landings (amount in weight and value by species and EU size grade). The Danish harbour sampling scheme is a Non-Probability Sample Survey, stratified by year, area, harbour, quarter, species and EU size grade. Concurrent samplings of Danish fisheries are conducted during at -sea sampling where both the discarded and the retained part of the catch are measured. During the harbours sampling the scheme also includes the commercial EU size sorting strata. Information on quantity of each species landed is recorded in the Danish first-hand buyer register, where data on catch area, size grades, value and vessel identity are also registered. The sampling scheme is further stratifies into quarter, and for each quarter there are at least two to five samples pr size grade group. The sampling strategy used for sampling consumption species in harbors as described in section 3.1.i from the Commission Decision (EC) 2010/93.

The scientific evaluated and acceptable sampling procedure as previously used for sampling landings (see section III.C.2) will be adopted for planning the 2011-2013 sampling program. If Denmark is going to use the concurrent sampling approach for landings it would increase the cost of the national programme significantly as the time between landing and actual sale is so short (less than one hour) that all fish have to be bought. Even though the fish subsequent is sold the difference between cost price and the sale price will be high.

Concurrent sampling of landings at markets
This sampling scheme will be applied for metiers where discard rates are expected to be low (industrial landings and landings of herring)). In the Baltic this sampling strategy will be the primary strategy applied for trawls targeting small pelagic fish (e.g PTM_SPF_16-31_0_0). Data will be collected by staff from DTU Aqua or staff from the DF) by randomly sampling landings in harbours.

Sampling scheme 1 will be applied and information to be collected is total weight of landing by all species caught and length measurements are made for all species.

Concurrent sampling of catches at sea (at-sea sampling)

Sampling directed towards the estimation of discard was initiated in 1995 in the North Sea, the Skagerrak, the Kattegat and the Baltic Sea. The sampling has since 2002 been directed towards fisheries where discard occurred on a significant level. Based on sampling made from 1995 to 2000 it is verified that the discard rates obtained in the Danish gillnet fishery, the fishery using hooks and the small mesh size fishery are insignificant compared to the rest of the fisheries. Taking this into account and in order to maximize the level of certainty of the overall discard estimate the sampling was previously concentrated to the Danish fisheries shoving significant discard: demersal trawl (for fish and/or nephrops) and Danish seine. However, since fall 2009 discard rates on gill-netters have been monitored in the North Sea and it is planned to be conducted in the Baltic Sea as well in 2011-2013.

In 2011 a new sampling system has been introduced in the Danish sampling program, were vessels are selected on a stratified random basis, based on last year's data. For each metier and quarter a vessel selection spreadsheet has been computed and the vessels are weighted with the amount of trips conducted in the same quarter and water one year earlier. When a vessel is selected by the computer the observers are calling the skipper and ask for the possibility to conduct an observer trip. As the system is weighting the amounts of trips conducted by the vessel it is possible to select the same ship more than once in a quarter.

The fisherman answers are registered in a log. If a skipper has refused to have observers onboard we do not recall the same skipper that year although the ship is selected again, however the ship is registered with the same answer. If the skipper says "no" but is given a more vague answer (try again later or it is not fitting very good right now) we are calling again the next time the vessel is being selected.

Since the 1. quarter in 2011 refusal rates has been registered for the inner Danish waters and since 2. quarter 2011 in the North Sea and Skagerrak. Refusal rates have been categorised in 8 main answers; 1) Is not fishing at the moment or is fishing in another metier 2) ship is wreaked 3) no contact 3) Try later 4) skipper claims the sheep is to small 5) Ship has been sold 6) refuse to have observers on board 5) observer trip conducted.

The fishery performed in different areas differs considerably in respect to duration, number of station per trip and handling of the catch. In the North Sea trips are up to 10 days of duration, while trips of 1-2 days duration are common in the Kattegat and the Baltic Sea.

Because fisheries differ between areas different sampling procedures are applied. If possible, all biological information from the catch will be sampled from each station.

Those are:
> Total weight of discard and landing by all species caught.

> Separate length distributions of discard and landings by all relevant species caught.

> Otoliths and individual mean weight per cm-length group of selected discarded species.

In addition all relevant vessel, gear and geographical information will be recorded.

(d) Target and frame population

The commercial Danish data collected within the DCF has been dividing the sampling into strata in time (Quarters) and space (Subdivisions) to obtain a broad picture mirroring the activities of the metiers and/or landings of the stocks. Furthermore we have increased the number of sampled trips/landings in relation to number of fish landed in the given fishery.

However in 2008-2010 ICES were hosting 3 workshops WKACCU, WKPRECISE and WKMERGE were Denmark participated and here it was concluded that a more systematic approach is needed to accurately be able to evaluate possible bias and precision in the data collection. Design and especially implementation of statistically sound catch sampling programmes is rather difficult and need thorough analysis and coordination between nations in order to be successful. The main reasons for the difficulties are the complexity in the metier approach, cluster effects and a range of logistical constrains such as sampling of very difficult obtained areas (harbours), refusal of participation of an observer or very bad working condition onboard some vessels. Furthermore, Denmark has to work towards avoiding over stratification as we are in the risk of having too many strata with very few data and thereby have to borrow biology from similar strata. This approach has also been highlighted at the ICES workshop as an approach that should be minimized. National implementation would benefit from transparent international discussions on assumptions and experiences, as suggested by ICES PGCCDBS 2010. Statistical tools available to analysis the data are also of great importance, however the newly developed COST tools can only handle data if the primary sampling unit is trip based.

.As was stated in the Danish national program last year, DTU Aqua has initiated a new statistically sound sampling frame described in table IIIC.4and in the section above. . The sampling frames are intended to cover all trips in a metier. The temporal frame (IIIC.4) shows how the different areas are sampled during certain seasons. Details on seasonal fishing pattern are in relevant cases included in the description of the different metiers.

(e) Sampling stratification and allocation scheme

The Danish sampling effort has been allocated based on prior knowledge of the metiers, importance of metiers compared to an international catch level and the importance of data in a stock assessment relation. Furthermore we will in 2010 start to evaluate and take into account the precision targets. Sampling effort is allocated to ensure that the number of trips sampled is at least one per month or is covering throughout the fishing season. A detailed analysis of the sampling precision has however been waiting for the finalisation of the COST project. The work has been initialised and is a part of the overall effort to improve our sampling designs in 2010. Expected number of sampled trips by metier is presented in table III.C.3. The level of observer trips has in 2011 been changed in relation the to analysis conducted during 2010 and 2011. Therefore the numbers of trips to be sampled in the observers program has been changed in this updated program and is now reflecting that the primary sampling unit is trips and that the weighting between metiers are depending on the numbers of trips conducted within the metier.

Table III.C.5 shows sampling intensity of length measurements of all G1 and G2 species listed in Appendix VII. The Danish sampling strategy for metiers is aiming for a certain number of trips rather than targeting a certain number of individuals to be measured. In the sea sampling programme, Denmark takes random subsamples containing approximately:

For species with a large occurrence at the trip/haul:

Discards; 100 individuals / haul for cod and other species with a wide length frequency; 50 ind/haul for other species.

Landings; 100 individuals / size category for cod and other species with a wide length frequency; 50 ind /haul for other species.

for other species:

All available individuals within the trip/haul/sample

As the catch composition and volume in catch is not known beforehand, numbers of length measured individuals are impossible to predict and plan exactly. In table III.C.5 number of length measured individuals sampled in 2009 are listed to give an idea of sampling levels. Cells containing "0" means that the species was not caught and length measured in 2009 but could appear in future catches.

III.C.2 Estimation procedures

All metiers merged in section IIIC2 has been analysed according to the catch composition and more detailed description can be found in section IIIC1 (b). Each metier selected has been described and if more metiers are merged the catch composition for each metier has been described.

At the ICES WKISCON meeting 2008 Denmark presented a study (Folmer, 2008) on the sampling system used in Denmark and the statistical consequences. This study shows no significant differences in length or weight between samples from different fisheries within the same commercial EU size grade and within the same area. The sales-slips register can give information on the size distribution and the species composition of the catch. Together with the logbook data this information can be used to estimate the spatial and temporal distribution per species and size grade for each metiér. Subsequently the size grade landing data from the different metiérs can be partition into length or age distributions.

The results from this study confirm that the Danish sampling system do not have to be changed in order to meet the same objectives as for concurrent sampling.

Estimation of discard volumes

Denmark will use FishFrame 5.0 (www.fishframe.org) for estimation of discard volumes in the future for all areas. Denmark has used the method described in Box 1 before.

Box 1. Estimation of discard volumes

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1. Estimating the discard percentage

From the discard samples the discard percentage is calculated per fishery (national definition), area, quarter and species. As the number of samples per year is not considered to be enough, a running mean is used, where samples from a year and three years back are used.

W_dis: Discard weight in samples by fishery, area, quarter and species

W_kon: Weight of landed fish in samples by fishery, area and quarter

Mw_dis: Mean weight of discard from samples by fishery, area, quarter and species

Dis_pct = (w_dis*100)/w_kon

2. Estimating the total discard weight

Kg: Total landing weight by fishery, area and quarter

Dis_ton = ((dis_pct/100)*kg)/1000

Dis_number = dis_ton*1000/mw_dis

There are several methods for estimation of discard volumes in Fishframe 5.0, but Method 3 - 'Raising by adjusted landing weight of all species' (see Box 2 for Algorithm) is equivalent with the method described above. The estimation of the percentage of discard (*Fraction_Discard*) will be stratified by year, quarter, fishing ground, métier (level 6) and species.

Box 2. Estimation of discard volumes in FishFrame 5.0

Method 3:

Raising by landing weight of all species, matching without size category without species.

This method is like method 1 except for:

1. Get total weight
   Landings: Not relevant.
   Discards: Get ratio as (discarded weight / landed weight of all species). Multiply ratio with the total weight in commercial landings (CL).
   Algorithm:

   $$Weight\_Discard_{strat\_1a,CCat=Discard} = Fraction\_Discard_{strat\_2a} * Weight\_Landing_{strat\_1b,CCat=Landing}$$

$$Weight\_Landing_{strat\_1b,CCat=Landing} = \sum_{Sp}(CL.LandingsMultiplier_{strat\_1a} *$$

$$(CL.UnallocatedCatchWeight_{strat\_1a} +$$

$$CL.AreaMisreportedCatchWeight_{strat\_1a} +$$

$$CL.OfficialLandingsWeight_{strat\_1a}))$$

$$Fraction\_Discard_{strat\_2a} = \frac{Weight\_Discard_{strat\_2a,CCat=Discard}}{Weight\_Landing_{strat\_2b,CCat=Landing}},$$

$$Weight\_Discard_{strat\_2a,CCat=Discard} = \sum_{(A+(SR)->A_{scheme})(M)} \sum_{(SR)} \sum_{Trip} \sum_{Stat} \sum_{SSCat} \sum_{SCat} CS.SL.Weight_{strat\_3,CCat=Discard}$$

$$Weight\_Landing_{strat\_2b,CCat=Landing} = \sum_{(A+(SR)->A_{scheme})(M)} \sum_{(SR)} \sum_{Trip} \sum_{Stat} \sum_{Sp} \sum_{Sto} \sum_{SSCat} \sum_{SCat} CS.SL.Weight_{strat\_3,CCat=Landing}$$

$strat\_1a = VFC, LC, Y, Q, (M), A, (SR), FAC, Sp, Sto, CCat, LCat$

$strat\_1b = VFC, LC, Y, Q, (M), A, (SR), FAC, CCat, LCat$

$strat\_2a = VFC, Y, Q, A_{scheme}, FAC, Sp, Sto, LCat$

$strat\_2b = VFC, Y, Q, A_{scheme}, FAC, LCat$

$strat\_3 = VFC, LC, Y, Q, M, A, FAC, Trip, Stat, Sp, Sto, CCat, LCat, SSCat, SCat$

Notes:

- As it can be seen in the equation, the stations are weighted by catch size (plain pooling) in this calculation.

Abbreviations:

Data or record types. The data namespaces follow a dot-delimited notation, like: is CS.HH refers to the HH record in the CS data.

CS = Commercial samplings. Consists of five different record types:

TR = Trip

HH = Station (Haul Header)

SL = Species List

HL = Length (Haul Length cell)

CA = Catch Aged = SMAWL (Sex-Maturity-Age-Weight-Length)

CL = Commercial Landing statistics. Consists of just one record type:

CL = Commercial Landing statistics

CE = Commercial Effort statistics. Consists of just one record type:

CE = Commercial Effort statistics

CC (Commercial Catches):

TW = Total weight

TN = Total number

AD = Age distribution

LD = Length distribution

Other record types, not included in the data exchange format:

SSLD = Standardized Sex Length Distribution

SALK = Sex Age Length Key

SSALD = Standardized Sex Age Length Distribution

Fields (see also the definitions in "**Error! Reference source not found.**").

Y = Year

Q = Quarter

M = Month

LC = Landing Country

VFC = Vessel Flag Country

SType = Sampling type

T = Trip

Sta = Station

FAC = Fishing activity category (métiers) introduced by the new DCR and maintained by the RCM's.

A = Area

SR = Statistical Rectangle

Sp = Species

Sto = Stock

LCat = LandingCategory (Human Consumption/Industry)

CCat = Catch category (Discard/Landing)

SCat = Size Category (Commercial sorting category)

S = Sex

L = Length

From Jansen *et al.* (2008)

Estimation of length and age structure of catches

Denmark will use FishFrame 5.0 (www.fishframe.org) for estimation of length and age structure of catches, see box 3 for Algorithm. For most stock the estimation of the Standardized Sex-length distribution (SSLD) and Sex-Age-length key (SALK) will be stratified by year, quarter, métier (level 6) and stock.

Box 3. Estimation of length and age structure of catches in FishFrame 5.0

Calculations of length and age structure of catches:

The following list orders the processes in the calculation:

1. TN
2. SALD
3. SALK
4. Extrapolate missing SALK for SALD
5. SSALD
6. AD
7. LD

Each step is described in detail below:

1. Total numbers (TN) at VFC, LC, Y, Q, (M), A, (SR), FAC, Sp, Sto, CCat, LCat and (SCat). Total numbers are the numbers of specimens in the commercial catches.
   Algorithm:

$$TN_{strat\_1} = \frac{TW_{strat\_1}}{MW\_OverAll_{strat\_2}}$$

$$TW_{strat\_1} = \sum_{(M),(SR),(SCat)} CC.Weight_{strat\_1} * 1000$$

$$MW\_OverAll_{strat\_2} = \frac{W_{strat\_2}}{N_{start\_2}}$$

$$W_{strat\_2} = \sum_{(A+(SR)->A_{scheme})(M)(SR),Trip,Stat,SSCat,(SCat)} \sum CS.SL.Weight_{strat\_2}$$

$$N_{start\_2} = \sum_{(A+(SR)->A_{scheme})(M)(SR),Trip,Stat,SSCat,(SCat)} \sum N_{strat\_3}$$

$$N_{strat\_3} = \sum_{(Sex),l} CS.HL.NoAtLength_{strat\_3,l,(Sex)} * \frac{CS.SL.Weight_{strat\_3}}{CS.SL.SubSampleWeight_{strat\_3}}$$

strat_1 = $VFC,LC,Y,Q,(M),A,(SR),FAC,Sp,Sto,CCat,LCat,(SCat)$

strat_2 = $VFC,LC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,CCat,LCat,(SCat)$

$strat\_3 = VFC, LC, Y, Q, M, A, FAC, Trip, Stat, Sp, Sto, CCat, LCat, SSCat, SCat$

Notes:

- As it can be seen in the equation, the stations are weighted by catch size (plain pooling) in this calculation.

2. Standardized Sex-length distribution (SSLD) at VFC, LC, Y, Q, (M), A_{Scheme}, (SR), FAC, Sp, Sto, (Sex), CCat, LCat and (SCat).
The SSLD is the length distribution from the sampling. The fractions are normalized to 1, so that the sum of fractions for all length is equal to 1.
Algorithm:

$$Fraction_{strat\_1} = \frac{\displaystyle\sum_{Trip, Stat} \left(\frac{NumInCatch_{strat\_2, (Sex), l}}{NumInCatch_{strat\_2, (Sex)}} * WeightOfCatch_{strat\_2} \right)}{\displaystyle\sum_{Trip, Stat} WeightOfCatch_{strat\_2}}$$

$$NumInCatch_{strat\_2, (Sex)} = \sum_{(Sex), l} NumInCatch_{strat\_2, (Sex), l}$$

$$NumInCatch_{strat\_2, (Sex), l} = \sum_{(A + (SR) -> A_{scheme})} \sum_{SSCat, (SCat)} NumInCatch_{strat\_3, (Sex), l}$$

$$NumInCatch_{strat\_3, (Sex), l} = \sum_{(Length -> LengthClass)} \sum_{(Sex)} CS.HL.NoAtLength_{strat\_3, (Sex), l} * \frac{CS.SL.Weight_{strat\_3}}{CS.SL.SubSampleWeight_{strat\_3}}$$

$$WeightOfCatch_{strat\_2} = \sum_{(A + (SR) -> A_{scheme})} \sum_{SSCat, (SCat)} CS.SL.Weight_{strat\_3}$$

$strat\_1 = VFC, Y, Q, (M), A_{Scheme}, FAC, Sp, Sto, (Sex), CCat, LCat, (SCat), Length$

$strat\_2 = VFC, LC, Y, Q, M, A_{Scheme}, FAC, Trip, Stat, Sp, Sto, CCat, LCat, (SCat)$

$strat\_3 = VFC, LC, Y, Q, M, A, FAC, Trip, Stat, Sp, Sto, CCat, LCat, SSCat, SCat$

Notes:

- As it can be seen in the equation, the stations are weighted by catch size (plain pooling) in this calculation.

3. Sex-Age-length key (SALK) at VFC, LC, Y, Q, (M), A_{Scheme}, (SR), FAC, Sp, Sto, (Sex), CCat, LCat and (SCat).

   The SALK is an age distribution for each length from the sampling and a mean weight at age and length. The fractions are normalized to 1, so that the sum of fractions for all ages for a given length is equal to 1.

   Algorithms:

$$Fraction_{strat\_1} = \frac{N_{strat\_1}}{N_{strat\_2}}$$

$$N_{strat\_2} = \sum_{l} N_{strat\_1}$$

$$N_{strat\_1} = AgeLength\Pr oc(\sum_{(A+(SR)->A_{scheme})VFC,LC,ST,\Pr oj,(SR),Trip,(Stat)} \sum \sum CS.CA.Number)$$

, where $CS.CA.Number = 1$ because there is always only one fish per CS.CA record and

$$AgeLength\Pr oc = \sum_{(Age<>AgePlusGroup)(Length->LengthClass)}$$

$strat\_1 = Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age,Length$

$strat\_2 = VFC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Length$

$$Weight\_Individual_{strat\_1} = \frac{AgeLength\Pr oc(\sum_{(A+(SR)->A_{scheme})FC,LC,ST,\Pr oj,(SR),Trip,(Stat)} \sum \sum CS.CA.Weight)}{AgeLength\Pr oc(\sum_{(A+(SR)->A_{scheme})VFC,LC,ST,\Pr oj,(SR),Trip,(Stat)} \sum \sum CS.CA.Number)}$$

, where $CS.CA.Number = 1$ because there is always only one fish per CS.CA record and

$$AgeLength\Pr oc = \sum_{(Age<>AgePlusGroup)(Length->LengthClass)}$$

$strat\_1 = Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age,Length$

$strat\_2 = VFC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age$

Notes:

> - As it can be seen in the equation, the stations are weighted by catch size (plain pooling) in this calculation.

4. Estimate missing SALK values (fractions and mean weights) where length exists in SSLD but no corresponding age readings could be extracted from the CA records.
   Estimation of age distribution for a missing length class uses linear regression of the four nearest data points (two longer and two shorter). When extrapolating beyond the shortest or longest fish, then only the singlemost closest length is used. The age distribution for the missing length is then set to equal the age distribution of the closest length. NB. This has the disadvantage of creating unrealistic ages for extreme long or short fish in special cases. In the next version, a filter should prevent this. Until then the user can always overwrite this in the extrapolation module.
   Estimation of weight uses the model Weight (g) = a*Length (cm)^b utilizing all data in the same stratum. To avoid unrealistic extreme weights, the resulting weights are checked. This check is: If the weight is higher (lower) than the highest (lowest) plus (minus) 5%, then the result are rejected. If a value can not be estimated, due to too few data, then all the same values from the same stratum are deleted. Then this appears as a hole in the next data processing module the "extrapolation module".
   Parameter estimation for length-weight follows the "least squares fitting power law" (Weisstein 2008):

   > Given a function of the form y = A*x^b
   >
   > least squares fitting gives the coefficients as

   $$b= \frac{n \sum_{i=1}^{n} (\ln x_i \ \ln y_i) - \sum_{i=1}^{n} (\ln x_i) \sum_{i=1}^{n} (\ln y_i)}{n \sum_{i=1}^{n} (\ln x_i)^2 - \left(\sum_{i=1}^{n} \ln x_i\right)^2}$$

   $$a = \frac{\sum_{i=1}^{n} (\ln y_i) - b \sum_{i=1}^{n} (\ln x_i)}{n},$$

   > where B = b and A = e^a

5. Standardized Sex-Age-length distribution (SSALD) at VFC, LC, Y, Q, (M), A$_{Scheme}$, (SR), FAC, Sp, Sto, (Sex), CCat, LCat and (SCat).
   The SSALD is an age and length distribution from the sampling. The fraction at each age-length is

accompanied with a mean weight and a mean length. The fractions are normalized to 1, so that the sum of fractions for all ages for and lengths is equal to 1.

Mean weight should be taken directly from SALK by age and length.

Mean length should be set to the mid point of the length class. The lower bound of the length class is given in the lengthClass field, while the range of the lengthclass (mm, ½cm, cm) was selected by the user when setting up the raising scheme.

Algorithms:

$$SSALD\_Fraction_{strat\_1} = SSLD.Fraction_{strat\_2} * SALK.Fraction_{strat\_3}$$

$$SSALD\_MeanWeight_{strat\_1} = SALK.MeanWeight_{strat\_3}$$

$$SSALD\_MeanLength_{strat\_1} = (SALK.Length)_{strat\_3} + \frac{(SALK.Length+1)_{strat\_3} - (SALK.Length)_{strat\_3}}{2}$$ wh

ere the VFC of SSALD_MeanWeight$_{strat\_1}$ and SSALD_MeanLength$_{strat\_1}$ is taken from the VFC in the data selection.

$strat\_1 = VFC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age,Length$

$strat\_2 = VFC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Length$ $strat\_3 = Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age,Length$

6. Age distribution (AD) at VFC, LC, Y, Q, (M), A, (SR), FAC, Sp, Sto, (Sex), CCat, LCat and (SCat).

The AD is the age distribution in the commercial catches. The numbers at each age is accompanied with a mean weight and a mean length.

AD is made by merging SSALD and TN. Subsequently the numbers area aggregated by age (across lengths) to get the raised numbers at age.

The mean weight (and mean length) is calculated as a weighted average of the mean weights (mean length) at age. The weighting factor is the fraction at age and length.

Algorithms:

$$N_{strat\_1} = TN.Number_{strat\_2} * \sum_{Length} SSALD.Fraction_{strat\_3}$$

$$MeanWeight_{strat\_1} = \frac{\sum_{Length} SSALD.MeanWeight_{strat\_3} * SSALD.Fraction_{strat\_3}}{\sum_{Length} SSALD.Fraction_{strat\_3}}$$

$$MeanLength_{strat\_1} = \frac{\sum_{Length} SSALD.MeanLength_{strat\_3} * SSALD.Fraction_{strat\_3}}{\sum_{Length} SSALD.Fraction_{strat\_3}}$$

$strat\_1 = VFC,Y,Q,(M),A,FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age$

$strat\_2 = VFC,Y,Q,(M),A,FAC,Sp,Sto,CCat,LCat,(SCat)$

$strat\_3 = VFC,Y,Q,(M),A_{Scheme},FAC,Sp,Sto,(Sex),CCat,LCat,(SCat),Age,Length$

Notes:

- $\sum_{(A+(SR)->A_{scheme})}$: The match between A from TN and A$_{Scheme}$ from SSALD are made through the area hierarchy, so that A or any parent of A should match A$_{Scheme}$.

Associated statistics

- Sample count. This field is calculated as the count of stations used when calculating the overall mean weight used to calculating the TotalNumber-record. If the record is "extrapolated then this value is 0.
- DataSourceAgeCount. This field is calculated as the number of aged fish (in CA records) used when calculating the age-length-key, and later used when calculating the Age distribution record.
- DataSourceLengthCount (length distribution). This field is calculated as the number of length measured fish (in HL records) used when calculating the length distribution, and again used when calculating the age distribution and length distribution records.

Abbreviations:

Data or record types. The data namespaces follow a dot-delimited notation, like: is CS.HH refers to the HH record in the CS data.

CS = Commercial samplings. Consists of five different record types:

TR = Trip

HH = Station (Haul Header)

SL = Species List

HL = Length (Haul Length cell)

CA = Catch Aged = SMAWL (Sex-Maturity-Age-Weight-Length)

CL = Commercial Landing statistics. Consists of just one record type:

CL = Commercial Landing statistics

CE = Commercial Effort statistics. Consists of just one record type:

CE = Commercial Effort statistics

CC (Commercial Catches):

TW = Total weight

TN = Total number

AD = Age distribution

LD = Length distribution

Other record types, not included in the data exchange format:

    SSLD = Standardized Sex Length Distribution

    SALK = Sex Age Length Key

    SSALD = Standardized Sex Age Length Distribution

Fields (see also the definitions in "**Error! Reference source not found.**").

    Y = Year

    Q = Quarter

    M = Month

    LC = Landing Country

    VFC = Vessel Flag Country

    SType = Sampling type

    T = Trip

    Sta = Station

    FAC = Fishing activity category (métiers) introduced by the new DCR and maintained by the RCM's.

    A = Area

    SR = Statistical Rectangle

    Sp = Species

    Sto = Stock

    LCat = LandingCategory (Human Consumption/Industry)

    CCat = Catch category (Discard/Landing)

    SCat = Size Category (Commercial sorting category)

    S = Sex

    L = Length

III.C.3 Data quality evaluation

Almost all landings in Denmark are landed to central buyers or auctions halls. Every year the initial sampling scheme is established based on the experiences from the previous year's landings and discard estimates. The sampling effort is expressed in number of trips at sea onboard commercial vessels carrying out regular fishery and number of harbour samples (including length frequency and age distribution) from each commercial sorting landed of all species landed. The scheme is stratified on métiers lvl6, subdivision and quarter. For harbour sampling the sampling scheme is further stratified on species and commercial sorting. If requested by the DCF and if the information is not obtained during scientific surveys, maturity and sex ratio are obtained as well. This scheme is distributed to key person employed by the DTU Aqua each being responsible for the everyday organization of the sampling in a defined subarea all together covering all Denmark.

The everyday organizers are in continuous contact with the fishermen and the auction halls and get information about deviations from last year scheme (decreas/increase of existing fisheries or emerging of new fisheries). The initial sampling scheme is adjusted accordingly but still under the constrains of the total number of samples.

The discard data are collected in agreement and in direct cooperation with the Danish Fishermen's association. This assures a continuous and fruitful communication between the industry and the fisheries biologists and facilitates the possibility of a continuous adjustment of the sampling scheme to the actual activity and trends in the industry. In the sea-sampling programme a main possible source of bias is the non-access to all vessels/trips. DTU Aqua will during the programme period keep track on the refusal rate and compare fishing patterns (spatial and temporal) between accessed trips and non-access trips and this issue will regularly be discussed with the industry in order to reduce the refusal rates. At the same time a careful going through the data collected looking at the premises for the sampling, not the results, assure that the data collected are in agreement with the reality defined as the understanding of the fishery based on discussions between in the fishermen and the biologists.

A very important spin-off from the discard sampling at sea is the opportunity to intensify the communication with the Danish Fishermen's organisations and the individual fisherman providing a natural possibility to explain and overcome the misunderstandings often existing between the fishermen and the fisheries biologists. This has already involved changes toward a more constructive and responsible attitude by the fishermen and the Fishermen's Organisation.

Denmark will try to spread out the sampling effort of the metier in time and space for the market/harbour sampling programmes. As sampling frames have not yet been implemented, it is therefore difficult to evaluate if certain parts of the trips have been excluded from selection and thereby could introduce bias.

Precision estimates from pervious sampling differ between metiers, years and quarters. For discards are the requirements in 2010/93/EC probably beyond achievable level without enormous costs. Denmark will during the NP periods work towards extended regional coordination of discard sampling in order to increase the overall precision but this requires survey designs that allows for regional task-sharing or the implementation of regional sampling programmes. DTU Aqua will participate in relevant ICES working groups to insure that Denmark is following the international guidelines in the best practice of setting up a statistically sound sampling program.

All raw data are recorded into the national database. Range and value checks are performed in connection with the store in the national database. If passed, the data are raised from sampling level to station level by documented automatic procedures in the national database. On routine basis, the data are then extracted and uploaded to the regional database, FishFrame. Here the raising from station level to total level and the data extrapolation is carried out following documented and consistent procedures (for detailed description, see FishFrame raising and data extrapolation part 1 and part 2 documentation). The tools provided by the COST project will be implemented in the FishFrame and be used to estimate the precision of the Danish sampling and the overall regional sampling.

Source	Recommendation	Danish action
RCM NS&EA 2011 Recommendations Use of FishFrame as regional database	The RCM NS&EA recommends that 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), Commercail Effort (CE) and Commerical Samples (CS) records for 2010 and 2011.	Danish data is already in FishFrame.
RCM NS&EA 2011 Recommendations Sampling summary information	RCM NS&EA recommends ICES makes the full list of NC contacts available to all WGs as part of its standard information pack.	Denmark supports this recommendation.
RCM NS&EA 2011 Recommendations Data raising methods	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 its ToR.	Denmark will participate at the WKPICS meeting.
RCM NS & EA 2011 Recommendation	Experience be gained in assessing quality indicators on stocks. Using the WKACCU score card.	Denmark has started to use the WKACCU scorecard.

III.C.4 Data presentation

The official landings statistics and well as the processing of fish and shell fish samples is finalized in the beginning of the following year of sampling. The main data end-users for data related to the metier based sampling have until now been expert working groups the ICES WGBFAS, WGBAST, WGELL and STECF SGMOS. The Danish data will be provided to ICES and to STECF to the set deadlines. This means that the data can be used to support scientific analysis as the basis for advice to fisheries management. Data to be used by STECF will be ready approximately 4 month later than the end of the sampling year. For other end-users data will be made available according to the provision laid down in Council Reg. 199/2008 article 18.

Data will be available at:

- All biological data will be available at a detailed level (sample level).

- At sea-observer data will be available at a detailed level (trip level).

- Research survey data will be available at a detailed level (haul level).

- Catch data per species will be available per rectangle per month.

III.C.5   Regional coordination

Denmark has for several years had cooperation and task sharing with Sweden, Finland and Germany. Furthermore, Denmark has worked actively at the RCM in the Baltic for increased coordination towards shared regional sampling programme.

Bilateral agreements have been made between Denmark and Sweden and Denmark and Germany. These agreements are attached as Appendix 1 to Appendix 3. The newest versions will be sent at a later stage.

Denmark has tried to apply to all recommendations made by the Regional Data Collection Meetings (RCM's) during the years since they were established in 2004. Below is a list of relevant recommendations each request is accompanied by a comment on how Denmark has applied to the request. Few requests have turned out not to be relevant at the time of realization as management decisions have changed the relevance of the recommendation. The introduction of a regional data base/warehouse, the FishFrame, will in many ways solve the problems experienced with ineffective regional coordination by providing basic sampling and analysis results and real time information about sampling status and by that make regional coordination much easier.

Métier related variables: Tasks prior to the RCM Baltic 2011		Danish action
RCM Baltic 2010 recommendation	Development of a report in FishFrame which calculate the top 90% ranking of metiers for each MS as well as on regional level. The data should be based on data from the two previous years.	DTU Aqua has been developing FishFrame and can hopefully follow up on this recommendation is cooperation with ICES.

Métier variables: Intersessional work		Danish action
RCM Baltic 2011 recommendation	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 (size and species distribution, spatial pattern) between countries within 1-2 métiers as a case study.	Denmark will follow this recommendation.

Métier variables: Tasks for the 2012 meeting		Danish action
RCM Baltic 2011 recommendation	Time should be set aside at the 2012 meeting for data handlers to discuss and provide guidelines on how to deal with allocation of trips into métier in particular in cases where information is incomplete.	Denmark will follow this recommendation.

Sampling of métier related variables: Making usage of the outcome of the Lot 2 project on VMS and logbook data	Danish action

RCM Baltic 2011 Recommendation	In order for all MS to gain the knowledge concluded in the Lot 2 project on VMS and logbook data, the RCM recommends a training workshop on how the different appropriate tools can be used.	Denmark is already using the VMS tool.

Sampling of Métier related variables including foreign landings : Requirement of on-line information on fleet behaviour		
RCM Baltic 2011 Recommendation	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.	DTU Aqua is having online access to VMS data.

Métier related variables: Routines for establishing bilateral agreements		Danish action
RCM Baltic 2011 Recommendation	1. MS should upload all landing data into FishFrame allowing the RCM to analyse the possible needs for bilateral agreements. 2. The RCMs should each year perform an analysis on landings in foreign countries and conclude were bilateral agreements needed to be made. MS should set up agreements, fixing the details of sampling, compilation and submission of data in each case when it is indicated by the RCM that a bilateral agreement is needed. To include the agreed analysis in FishFrame would be very convenient and time saving. 3. 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.	Denmark will follow this recommendation and all Danish data for 2009 and 2011 is already uploaded into FishFrame.

III.C.6 Derogations and non-conformities

Denmark request for derogations for at sea-sampling discard sampling for the following metiérs:

Metiérs Level 6	Fishing ground	Reason for applying for derogation
FPN_MDC_>0_0_0	27.SD22-24	Historic sampling information has confirmed that discard (release) for this metiér in periods is higher than 10%. However the survival of the released fish is assumed very high and this metier is therefore not selected for discard sampling.
PTM_SPF_32-89_0_0	27.SD22-24	This is a fishery for herring. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
PTM_SPF_16-31_0_0	27.SD22-24	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTB_DEF_90-104_0_0	27.SD22-24	This is a very small fishery landing only 170t in average a year mostly conducted on smaller shipps. Therefore it would be very expansive to case the few trips conducted by this metier
PTM_DEF_<16_0_0	27.SD22-24	This is a fishery for sandell. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
GNS_DEF_110-156_0_0	27.SD22-24	The metier is at present not included in the sea-sampling programme as the discard rate has been estimated to be below 10% and derogations is therefore applied for.

GNS_DEF_110-156_0_0	27.SD25-32	The metier is at present not included in the sea-sampling programme as the discard rate has been estimated to be below 10% and derogations is therefore applied for.
LLS_DEF_0_0_0	27.SD25-32	This is a very small (125 t) and very clean fishery for cod. Historic information confirms that the discard is below 10% for this metier and therefore there is applied for derogations
PTM_SPF_16-104_0_0	27.SD25-32	This is a sprat fishery. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.

NORTH SEA AND EAST ARCTIC

III.C.1   Data acquisition

Primary data collected under the Danish programme will be stored in the following databases:

  vi.   Vessel register. Data on fishing capacity. (FD)

 vii.   Logbook database. Data on origin of catches and on effort. (FD)

viii.   Sales notes database. Data on quantities landed and prices. (FD)

  ix.   Species composition database. Data on species composition in landings for industrial purposes. (FD)

  x.   Biological database. Data on discards and biological parameters. (DTU Aqua)

In order, for the three involved institutes (DTU Aqua, FOI and DST), to use the same primary data on capacity, effort, and geographical distribution of the origin of the landings a common database will be produced every year, the Danish Fisheries Analyses Database (DFAD) by DTU Aqua. This database is containing data from the register on Danish fishing vessels, Danish logbook information, the catch area declarations database together with data from the Danish sales notes database. As the data from these databases are merged it is possible to categorise each landing in one fleet segment, in one fishery etc. This database contains most of the information requested in research projects and in relation to fisheries management. The DFAD is quarterly and yearly updated. The design and development of the database is made in a co-operation between the three above mentioned institutes.

(a) Codification and naming convention

The fishing gear codes used for codification and naming includes more codes than agreed by the RCM's. The following steps have been used when metier definition has been made:

4. For each trip Level 1, Level 2, Level 3 and Level 4 of the metriér matrix is stated according to the gear used in the logbook.

5. For each trip the DFAD information (where logbook and sales slip information is merged) is used to rank the species by landed value. The step is used to determine Level 5 of the metier matrix.

6. Gear mesh size and sorting devise is used to determine metriér matrix Level 6.

Trips without match of sales slips and logbooks are omitted from the ranking as information to assign these trips to level 6 is not available. Furthermore, for vessels with loa (length over all) of less than 8 m. no logbook information is available. These trips have been characterized as "Trips out of matrix".

For some logbooks information is not adequate or missing e.g. missing mesh size and it is therefore not possible to assign these trips to level 6 of the matrix. These trips are categorized as "Trips out of matrix". The total landings of "Trips out of matrix" are limited and below 1%.

If fishing ground/area changed within trip, then effort (days_at_sea) per trip has been weighted within fishing grounds/areas by catch size of all species.

It should be mentioned when ranking the landed value by species (step 2) , no "mixed crustaceans and demersal fish" or no "mixed cephalopods and demersal fish" for Level 5 is used by Denmark.

(b) Selection of metier to sample

Information from the DFAD data base has been used to define the metiers to sample and the variables concerning metriér matrix Level 1-6. Selection of métiers based on effort, landings and value is based on data stored in the DFAD. Target species is defined as the species contributing most to the value per trip.

The Danish sampling system has been changed, see the Baltic section.

Outcome of ranking the Danish fishery in the North Sea and Eastern Arctic region is given in Table III.C.1. The metiérs to be sampled and metiérs to be grouped are given in Table III.C.3.

Even though a metiér according to the ranking guidelines has been selected to be sampled, not all metiérs meeting these criteria have been sampled. Reasons for deviation of the guidelines are given in section III.C.6.

The small scale fishery is included in the Danish sampling frame for all harbour sampling, however discard sampling is not conducted in vessels smaller than 10 meters, due to space and safety issues.

Fishing ground IIIaS (The Kattegat)

Danish Seine fisheries targeting demersal fish (SDN_DEF_90-119_0_0)

The Danish Seine fishery in Kattegat targeting demersal fish is very mixed fishery. In 2008-2010 the total average landings were 250t from this metier. Here 60% came from plaice, 23% flounder, 4% cod, 8% dab, and other species conducted 4% of the total catch. In Kattegat a large area has since 2009 in the South Eastern part been permanent closed for fishery to protect the Kattegat cod. This metier is in Kattegat not merged with other metiers.
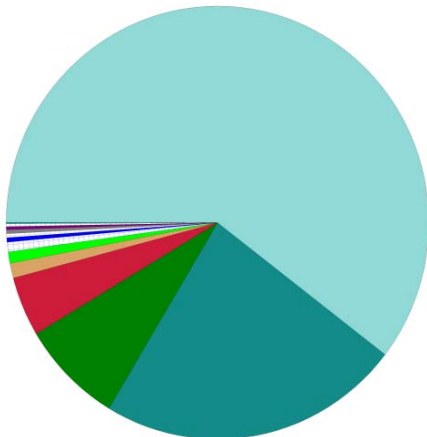
Relative landing patterns by species (light blue colour= plaice, blue= flounder and green= dab) for the metier SDN_DEF_90-119.

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season mainly in the 1st and 4th. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Bottom trawl fisheries targeting demersale crustaceans (OTB_MCD_90-119_0_0)

The Danish bottom trawl fishery is at present the most important fishery in Kattegat, the *Nephrops* are the most important target species however some demersale fish species is also of great importance especially sole. Although the fishery is divided in to metiers (with crustaceans or demersal fish as target species) this is not possible to differentiate in the sampling program. As this fishery is a very mixed fishery a part of the catches will have a higher value for fish than for *Nephrops,* however it is fished by the same gear and area. Therefore, the Danish sampling program has merged the two metiers in the sampling program and post-divided them in the two different target species categories in accordance to their landings. In the time frame 2008-2010 the average total landings from the mixed metier amounted to 2,520t. In Kattegat a large area has since 2009 in the South Eastern part been permanent closed for fishery to protect the Kattegat cod. However in the regulation there is a possibility to target crustaceans within the closed area if a sorting grid is used. There is no information of any Danish fishermen using this grid. 60% of the landing by value is *Nephrops,* however for the Danish fishermen the flatfishes are important by-catches and sole is accounting for 7% of the landings (however, a much larger part in value as Sole is considered a high value species), plaice for 12%, cod 5%, flounder 4%, brill 3%, haddock 2% and other species conducted 5% of the total catch. This metier is in Kattegat not merged with other metiers.

The metier has been included in the sea-sampling programme. Sampling will be stratified by quarter. The metier is merged with;

- PTB_MCD_90-119 (6t. Norway lobster is accounting for 63%, plaice for 12%, cod for 8%, haddock for 8% and sole for 2%)
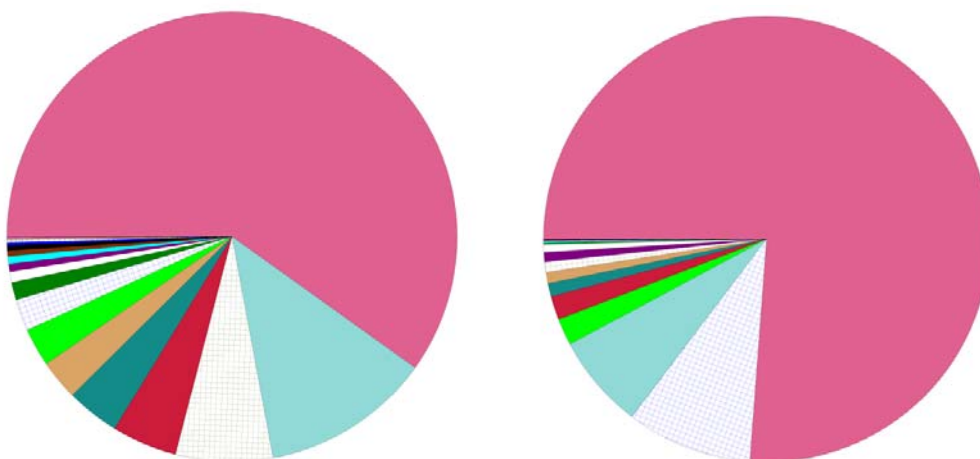
Relative landing patterns by species (pink colour = nephrops, light blue = plaice, white check pattern= sole red=cod and dark blue = flounder) for the metier OTB_MCD_90-119 (left) and PTB_MCD_90-119 (right).

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Trawl fisheries targeting small pelagic fish (OTM_SPF_16-31_0_0)

The trawl fishery with a mesh size from 16-31 mm in Kattegat is mainly a sprat fishery. In 2008-2010 the average total landings from this metier were 3,690t. Sprat were in average accounting for 80% of the landings in weight, 15% were from herring, 3% from sandell and other species conducted 3% of the total catch. The majority of the catches are taken by midwater trawlers using a mesh size of 16-31 mm. However, to some extent other trawls and mesh sizes are used within the fisheries and the metier is merged with;
- PTB_SPF_16-31 (78% sprat, 19% herring and other species conducted 2% of the total catch),
- OTB_SPF_16-31 (77% sprat, 15% herring, 2 % whiting and sandells accounted for 3% other species conducted 3% of the total catch) and
- PTM_SPF_16-31 (82% sprat, 15% herring and other species conducted 2% of the total catch)
Which all have a similar exploitation pattern and catch composition.
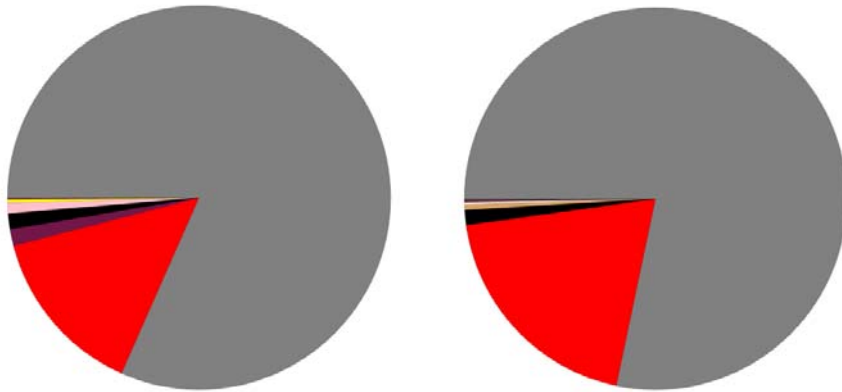
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier OTM_SPF_16-31 (left) and PTB_SPF_16-31(right).
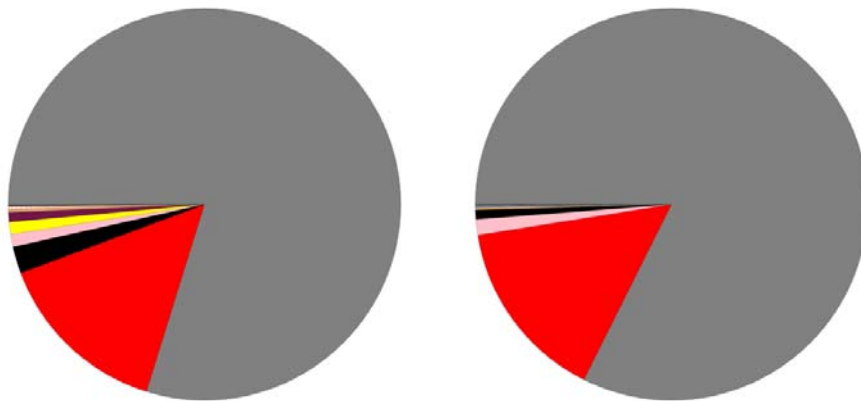
The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around

Trawl fisheries targeting small pelagic fish (PTM_SPF_32-69_0_0)
The trawl fishery with a mesh size from 32-69 mm in Kattegat is a herring fishery. In 2008-2010 the total landings in average from this metier was 2,300 t. Herring were in average accounting for 88% of the landings in weight and 11% were from sprat. The majority of the catches are taken by midwater pair trawlers using a mesh size of 32-69 mm. However, to some extent other trawls and mesh sizes are used within the fisheries and the exploitation pattern and catch composition of the gears is similar. The metier is merged with;

- PTB_SPF_32-69 (1,653 t in average with 91 % herring and 8% sprat) and
- OTB_SPF_32-69 (430 t in average with 87 % herring and 13% sprat)
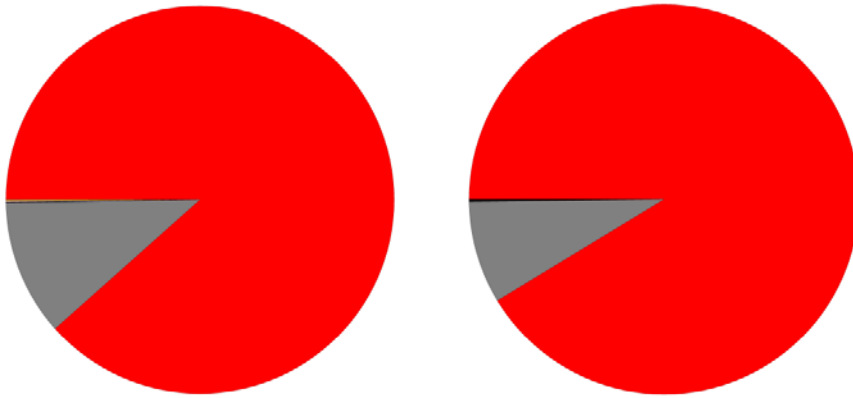
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTM_SPF_32-89 (left) and PTB_SPF_32-69 (right)
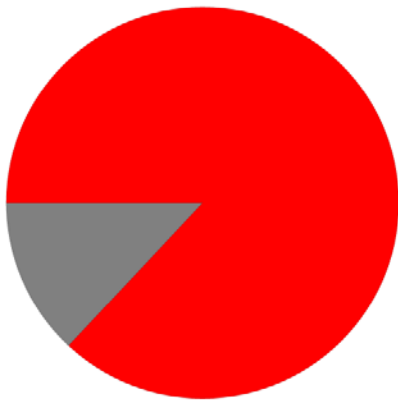
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier OTB_SPF_32-69

The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Fishing ground IIIa (Skagerrak and Kattegat)

Set gillnet fisheries targeting demersal fish (GNS_DEF_120-219_0_0)
For gillnetters with the same mesh size it was concluded that the similarity in the fishing pattern were larger between area (IIIan and IIIas) than between different mesh size within the same area. For to this reason it was decided to merge these fishery to one.
In 2008 to 2010 the average of the total landing from the metier in Kattegat were accounted for 113 t and is a very mixed fishery. Plaice accounted for the largest part in weight of the landings in this metier 31%, cod accounted for 19%, 11% flounder, 10% saithe, 9% sole, 7% lumpsucker, 4% dab, 3% turbot and 7% of the landed weight came from other species.

In 2008 to 2010 the average of the total landing from the metier in Skagerrak were accounted for 1,880t and is a very mixed fishery targeting cod and plaice as the main species. Cod accounted for the largest part in weight of the landings in this metier 42%, plaice accounted for 39%, pollack for 7%, saithe for 2%, hake 4% and 6% of the landed weight came from other species.
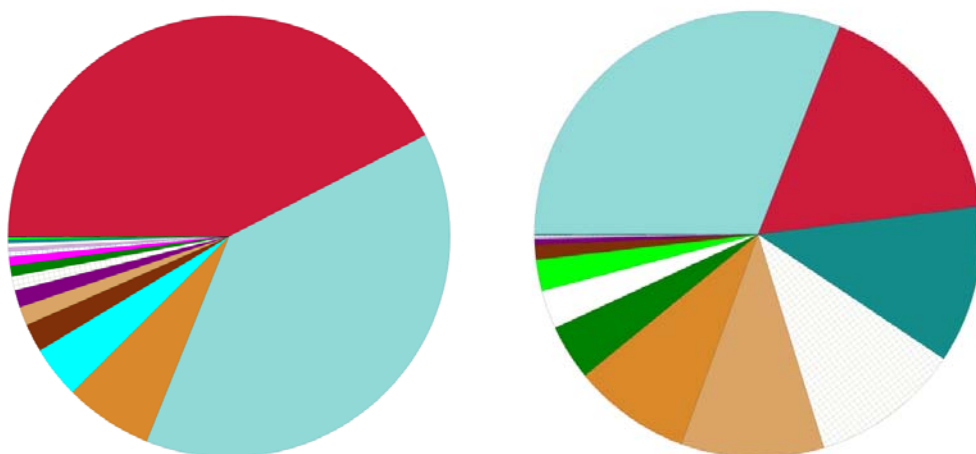
Relative landing patterns by species (light blue colour= plaice, red=cod and white squares= haddock) for the metier GNS_DEF_>=120-219 (Skagerrak) and GNS_DEF_>=120-219 (Kattegat).

The merged metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Set gillnet fisheries targeting demersal fish (GNS_DEF_100-119_0_0)

For gillnetters with the same mesh size it was concluded that the similarity in the fishing pattern were larger between area (IIIan and IIIas) than between different mesh size within the same area. Due to this reason it was decided to consider these as one fishery. In 2008 to 2010 the average of the total landing from the metier in Kattegat were accounted for 49 t. composing of sole 68%, 14% plaice, 4% dab and 3% flounders. In Skagerrak the metier only accounting for 27t landed divided in plaice as the most important part with 42%, Sole accounting for 31%, cod 15%, dab 3%, crabs 2%, hake 2% and 6% of the landed weight came from other species.

The metier will be sampled concurrently in harbours/at markets as the total catch from this metier is very low. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.
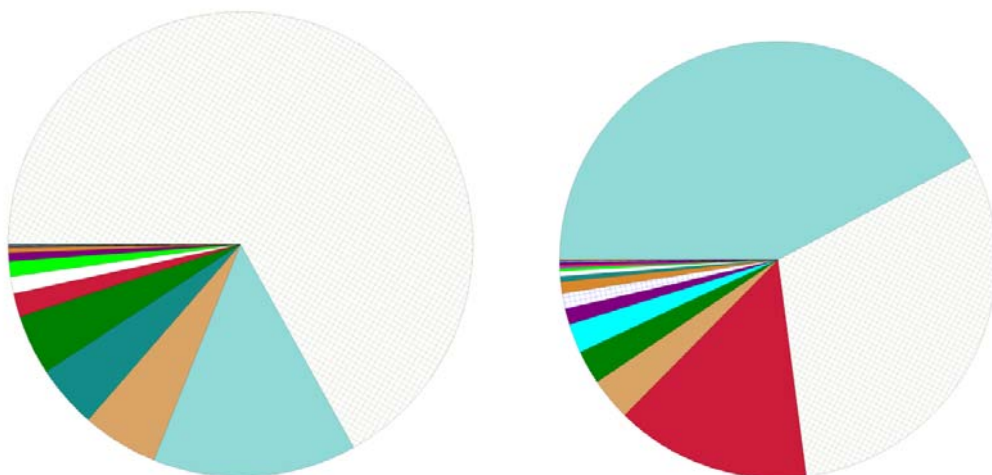
Relative landing patterns by species (light blue colour= plaice, red=cod and white squares= haddock) for the metier GNS_DEF_100-119 (Kattegat) and GNS_DEF_100-119 (Skagerrak).

Fishing ground IIIaN (The Skagerrak)

Bottom trawl fisheries targeting demersale crustaceans (OTB_MCD_90-119_0_0)
The Danish bottom trawl fishery for mixed crustaceans and demersale fish is at present the most important fishery in value in Skagerrak. Within 2008-2010 the average total landings from this metier were 8,800t. Compared to Kattegat the fishery in Skagerrak is more mixed with many by-catch species. *Nephrops* is accounting for 21% of the landing by weight, cod is accounting for 11% of the landings, saithe for 30%, plaice 16%, brill 2.8%, witch flounder 4%, haddock 5%, hake 3%, monk fish 2% and 7% of the landed weight came from other species. This metier is in Skagerrak merged with;

- OTB_MCD_>=120 (2060t. Saithe is accounting for 32% of the landings, cod for 11%, haddock 9%, 3% *Nephrops,* monk 3%, lemon sole 2%, dab 2%, and 7% of the landed weight came from other species).
- PTB_MCD_>=120 (40t. cod is accounting for 50%, saithe for 23%, haddock 16%, plaice for 5%, hake for 4% and 3% of the landed weight came from other species).
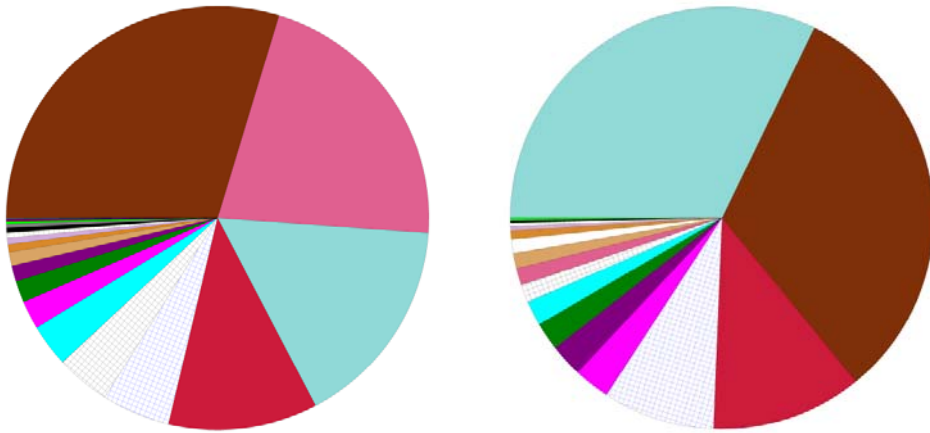
Relative landing patterns by species for the metier OTB_MCD_90_119 and OTB_ MCD_>=120
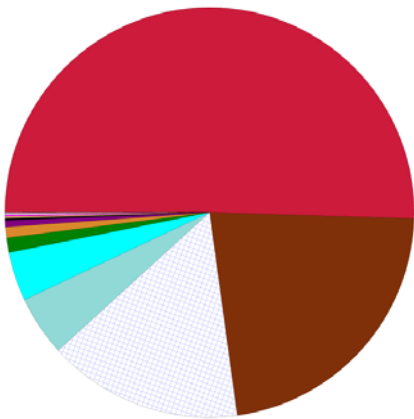
Relative landing patterns by species for the metier PTB_ MCD_>=120

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Bottom trawl fisheries targeting demersale crustaceans (OTB_CRU_32-69_0_0)
The Danish bottom trawl fishery for crustaceans with mesh sizes between 32-69 mm is a deep water shrimp fishery. In 2008-2010 the average total landings from this metier were 2,000 t. Deep water shrimps were in average accounting for 83% of the total landings in weight. However some cod- fishes are landed as by-catches. Cod accounted for 2% of the landings and saithe for 11% and 4% of the landed weight came from other species. This metier is in Skagerrak not merged with other metiers. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
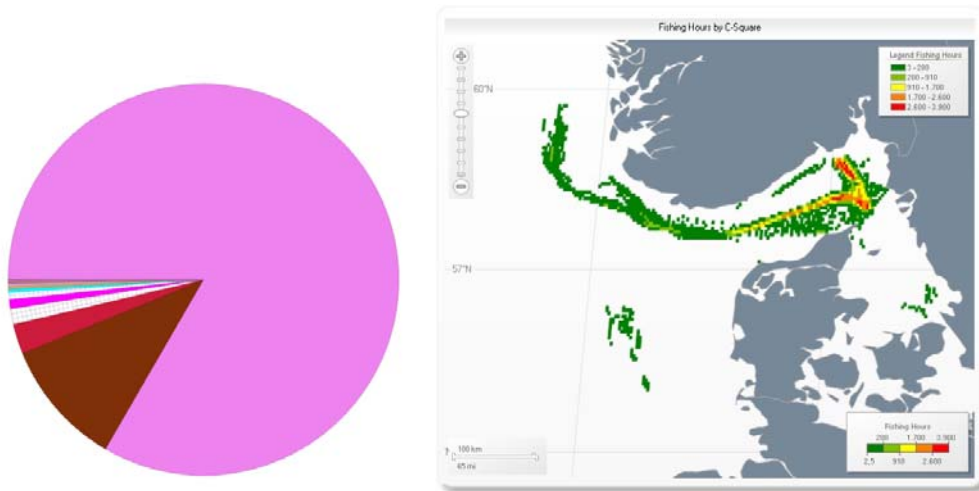
.Figure XX. Relative landing patterns by species (purple= deep water shrimp, brown= saithe) for the metier OTB_CRU_32-69 (left) and Danish VMS signals for the same metier.

Danish Seine fisheries targeting demersale fish (SDN_DEF_90-119_0_0)

The Danish Seine fishery in Skagerrak is as the bottom trawl fishery a very valued fishery targeting a mix of species, however compared to the trawlers the plaice is the most value species in the Seine fishery. SDN_DEF_90-119 (3,610 t consisting of 70% plaice, 11% cod, 8% haddock, 4% dab, 3% witch flounder and 4% of the landed weight came from other species). This metier will in IV +VIIId be merged with a metier of less importance but with a similar catch composition the;

- SDN_DEF_>=120 (650 t consisting of 72% plaice, 15% cod, 5% haddock, 3% dab and 5% of the landed weight came from other species).
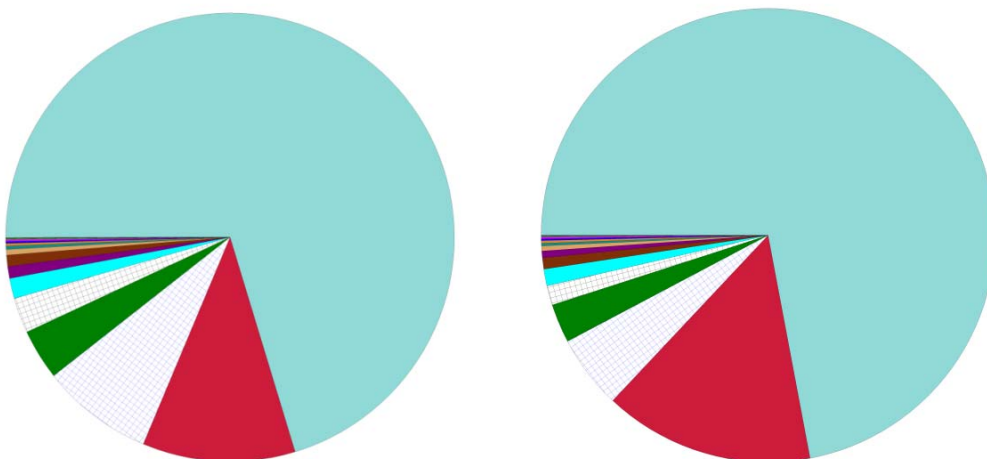
Relative landing patterns by species (light blue colour= plaice, red=cod and white squares= haddock) for the metier SDN_DEF_90-119 (left) and SDN_DEF_>=120 (right).

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Trawl fisheries targeting small pelagic fish (OTB_SPF_32-69_0_0)

In 2008-2010 the total average annual landing in value of in this metier was 3,300 t. The landings constitute 98% of herring and 2% other species. The majority of the landings are for human consumption but there are also landings for industrial purposes. The fisheries are conducted all year around but are less intense during summer. The majority of the catches are taken by bottom trawlers using a mesh size of 32-69 mm. However, to some extent other trawls and mesh sizes are used within the fisheries and the exploitation pattern and catch composition of the gears is the similar. The metier is merged with;

- PTM_SPF_32-69 (3,480t. 98% herring 2% other species),
- OTM_SPF_32-69 (3,300t, 98% herring and 2% other species),
- PS_SPF_ALL (1,000t. 97% herring and 3% Norway pout).

The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
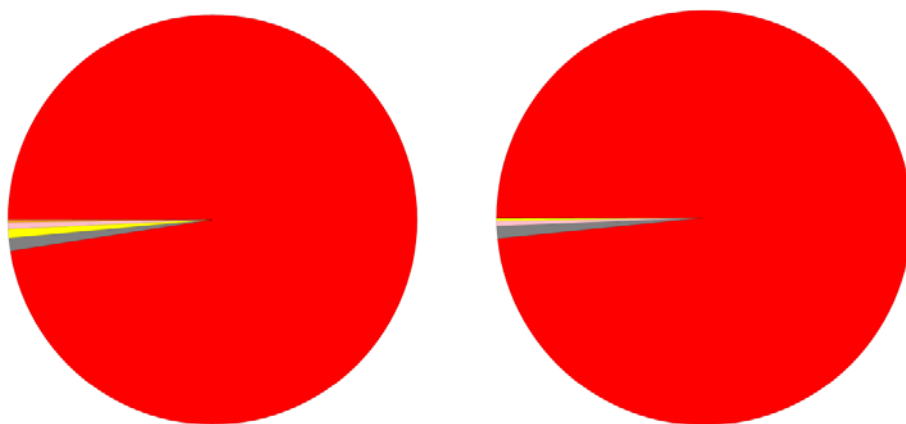
. Relative landing patterns by species (red colour = herring, grey = sprat) for the metier OTB_SPF_32-69 (left) and PTM_SPF_32-69 (right).
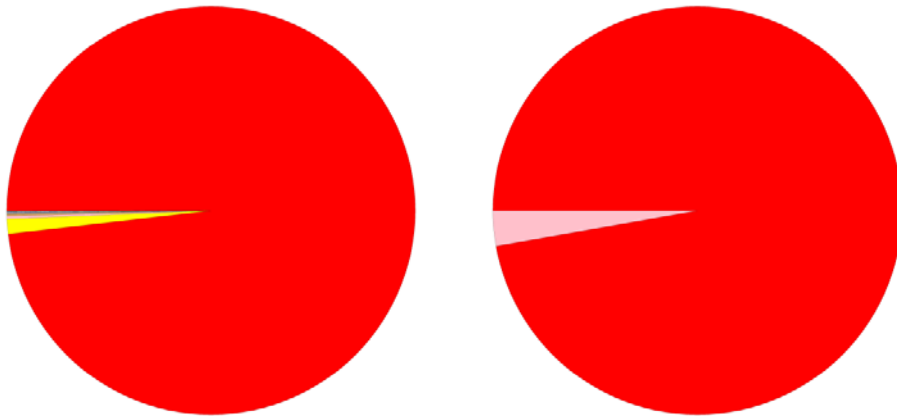
Relative landing patterns by species (red colour = herring, pink = Norway pout) for the metier OTM_SPF_32-69 (left) and PS_SPF_>0.

The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Trawl fisheries targeting small dermasal fish (OTB_DEF_<16_0_0)

The Danish bottom trawl fishery targeting sandell is in tons the largest fishery in Skagerrak landing 8,200t. The fishery first starts the 1 of April and last to 1 of August in years with high catches of smaller fish and ends in July with lower catch but of larger fish. 98% of the landed weight arrives from sandell. The species is sampled in three different ways 1) by harbour samples 2) real-time samples and 3) fisherman samples. The two first sample methods are conducted by the Danish control and information on precise fishing location can be difficult to obtain. Sample type 3) is a project developed with the Danish fishermen's organisation and here information on a haul by haul basis is provided and the quality of the samples is much better. In 2011 the real time sampling were not conducted as the advice and assessment has changed. This metier has in Skagerrak been merged with a metier of less importance but with a similar catch composition the;

- OTM_DEF_<16 (640t. consisting of 98% sandell).
- PTB_DEF_<16 (380t. consisting of 98% sandell).
- PTM_DEF_<16 (80t. consisting of 96% sandell).
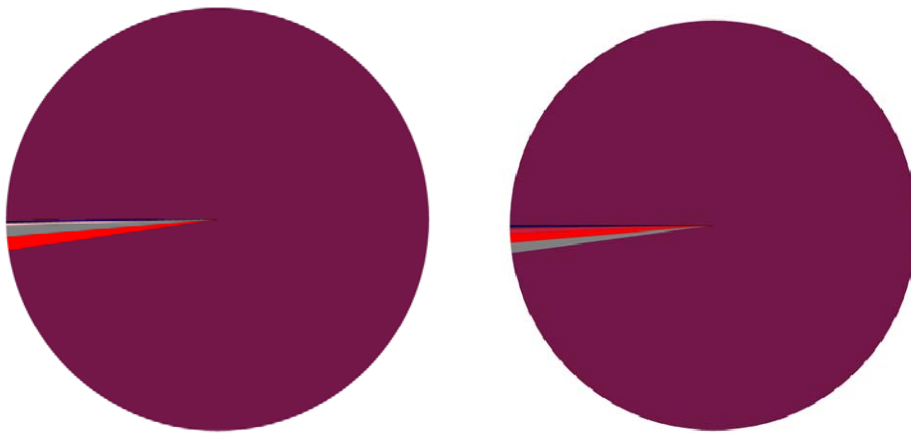
Relative landing patterns by species (dark purple= sand ell) for the metier OTB_DEF<16 (left) and OTM_DEF_<16 (right).
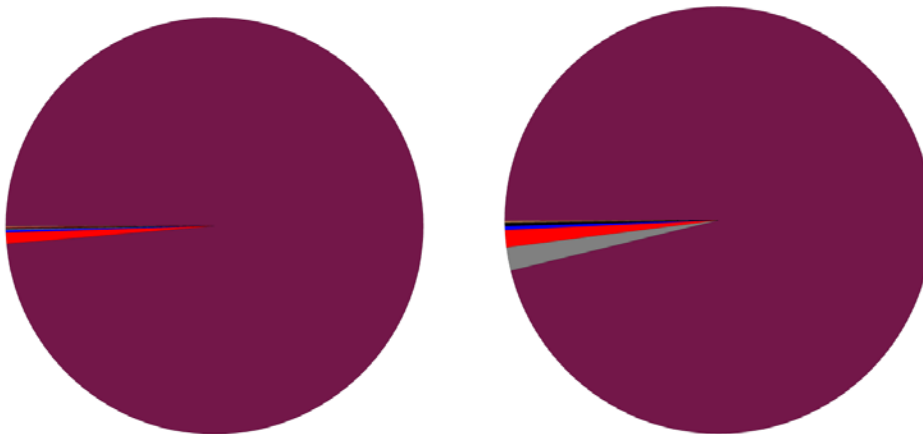
Relative landing patterns by species (dark purple= sand ell) for the metier PTB_DEF<16 (left) and PTM_DEF_<16 (right).

The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Fishing ground VI - VIId (The North Sea)

Trawl fisheries targeting small pelagic fish (OTM_SPF_32-69_0_0) area I and II
The Danish trawl fishery targeting small pelagic fish in the North Sea (I and II) landed in 2008-2010 a total average annual landing of 16,700t. The landings consist of 100% herring. The metier will be merged with;

- PTM_SPF_32-69 (16,700t. consisting of 100% herring), and
- OTB_SPF_32-69 (2,460t. consisting of 99% herring)

- PS__SPF_ALL (12,200t. consisting of 87% herring and 13% mackerel)

due to the very similar catch composition.
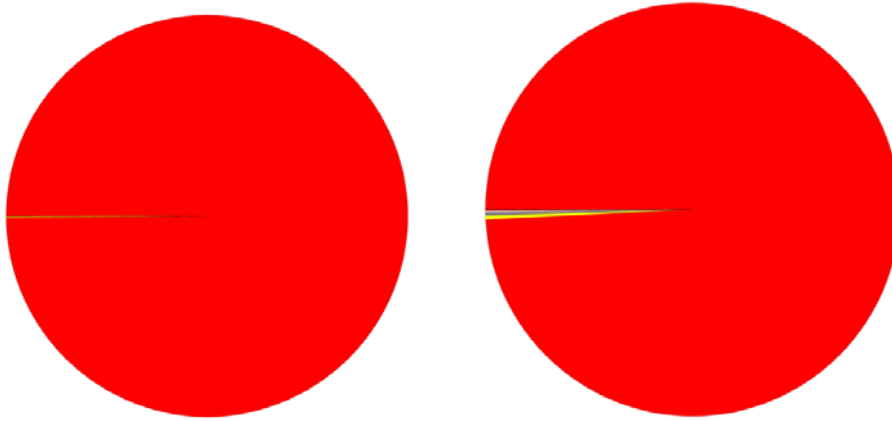
Relative landing patterns by species (red colour = herring) for the metier OTM_SPF_32-69 (left) and OTB_SPF_32-69 (right).

Relative landing patterns by species (red colour = herring and orange= mackerel) for the metier PS__SPF_ALL

Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied.

Set gillnet fisheries targeting demersale fish (GNS_DEF_120-219_0_0)

GNS_DEF_120-219 in the North Sea accounted in average in 2008 to 2010 total landing was in average 4,430t, and is a very mixed fishery targeting cod as the main species. Cod accounted for the largest part in weight of the landings in this metier 40%, plaice accounted for 39%, 8% hake, 3% dab, and 10% of the landed weight came from other species. The metier GNS_DEF_120-219 is by far the most important gillnet metier in the North Sea. As each gillnet mesh size is targeting different species the gillnet metiers in the North Sea has not been merged.
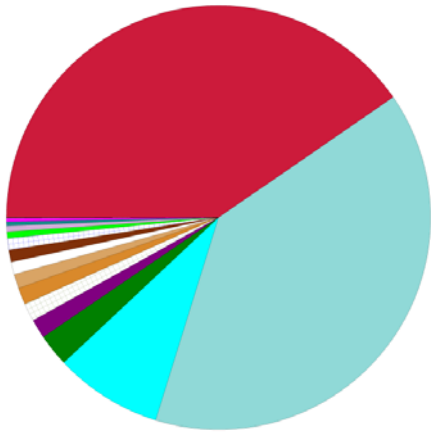
Relative landing patterns by species (red colour=cod, light blue= plaice, turquoise=hake) for the metier GNS_DEF_=120-219

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Set gillnet fisheries targeting demersale fish (GNS_DEF_100-119_0_0)

GNS_DEF_100-119 in the North Sea accounted in total landing in 2008 to 2010 in average 190t, and is a small mixed fishery targeting sole as the main species. Sole accounted for the largest part in weight of the landings in this metier 61%, plaice accounted for 17%, 4% cod, 3% hake, 7% dab, and 8% of the landed weight came from other species. The metier GNS_DEF_100-119 is merged with another tiny fishery;

- GNS_DEF_90-99 (10t, consisting of 81 % sole, 4% plaice, 4% dab, 4% cod and 7% other)
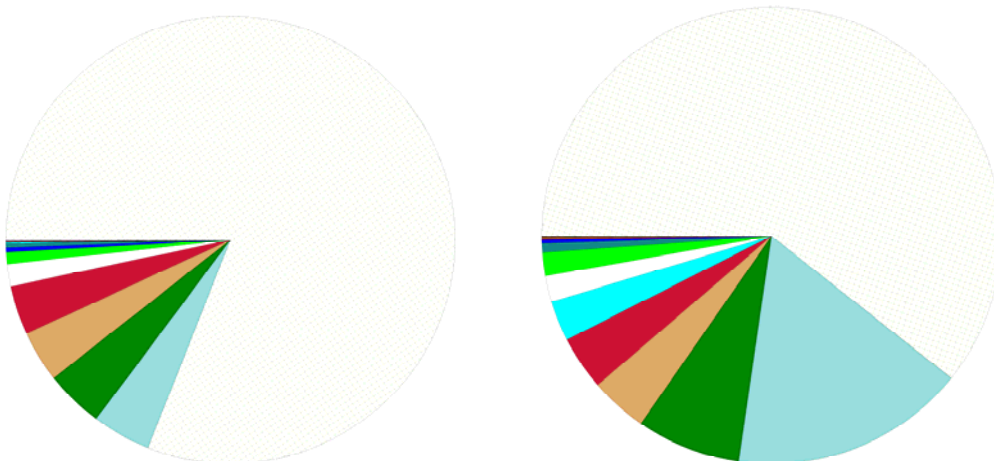
Relative landing patterns by species (light blue colour= plaice, red=cod and white squares= ole) for the metier GNS_DEF_90-99 (left) and GNS_DEF_100-119 (right).

The metier will only be sampled concurrently in harbours/at markets as the total amount is very small. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Set gillnet fisheries targeting demersale fish (GNS_DEF_>=220_0_0)

GNS_DEF_>=220 in the North Sea accounted in average in 2008 to 2010 total landing was in average 282 t, and is a very mixed fishery targeting turbot as the main species. Turbot accounted for the largest part in weight of the landings in this metier 62%, plaice accounted for 8%, 10% cod, 8% monk, 3% brill, and 9% of the landed weight came from other species. This metier is not merged with any other metiers.
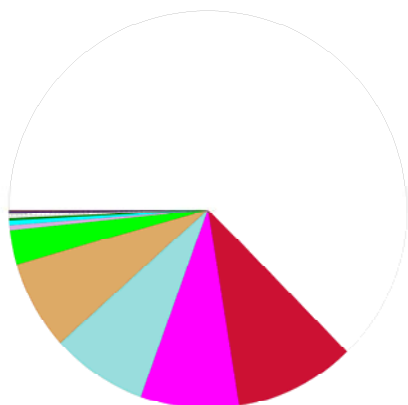
Relative landing patterns by species (light blue colour= plaice, red=cod, pink=monk and white= turbot) for the metier GNS_DEF_>=220.

The metier will only be sampled concurrently in harbours/at markets as the total amount is very small. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Trawl fisheries targeting demersale fish (OTB_MCD_>=120_0_0)

The trawl fishery with mesh size above 120 is in the North Sea the second most important Danish fishery in value and is a very mixed fishery. In 2008-2010 the total average annual landing in weight of in this metier was 14,100t. It is a very mixed fishery and therefore changing over the season. The main part of the landed catch composition derives from saithe accounting for 30%, plaice were 22% of the landed weight, cod were accounting for 13%, monk 8%, hake 7%, lemon sole for 4%, 3% from haddock and ling respectively, 3% *Nephrops* and 3% of the landed weight came from other species This metier has in IV +VIIId been merged with a metier of less importance but with a similar catch composition the;

- OTB_MCD_100-119 (1,540t. consisting of 65% plaice, lemon sole for 9%, saithe 7%, dab 7%, cod were accounting for 3%, turbot 3%, and 6% of the landed weight came from other species
- PTB_ MCD_>=120 (100t. consisting of 49% cod, 21% saithe, 18% haddock, 4% plaice and 7% of the landed weight came from other species)

The metier will be sampled concurrently at sea throughout the fishing season.
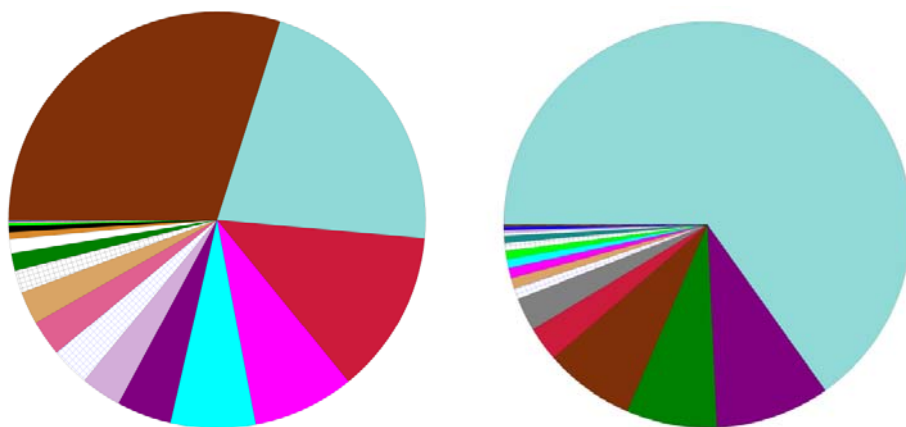
 Relative landing patterns by species (brown colour= saithe, light blue = plaice, red=cod and light pink = *Nephrops*) for the metier OTB_ MCD_>=120 (left) and OTB_MCD_90_119 (right).
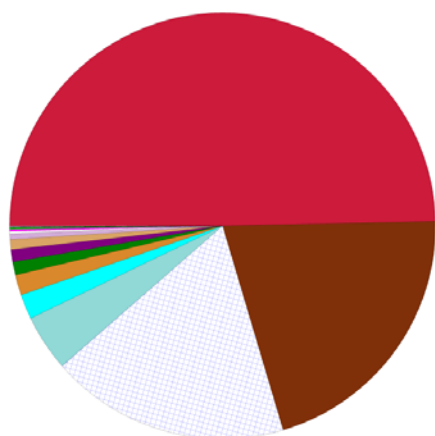
 Relative landing patterns by species (brown colour= saithe, light blue = plaice, red=cod and light pink = *Nephrops*) for the metier PTB_ MCD_>=120

 The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Bottom trawl fisheries targeting demersale crustaceans (OTB_MCD_70-99_0_0)
The Danish bottom trawl fishery for mixed demersale and crustaceans with mesh sizes between 70-99 mm is mainly a *Nephrops* fishery with some by-catches. In 2008-2010 the average total landings from this metier were 1 160t. 37% of the landing by weight is *Nephrops*, plaice is accounting for 35%, monkfish for 7%, hake and cod for 3%, whitch flounder and dab for 2% for and 10% of the landed weight came from other species.
This metier is in the North Sea not merged with other metiers.
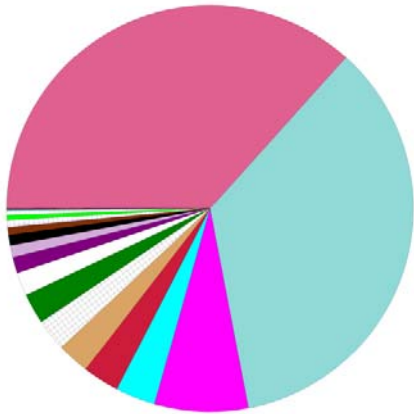
Relative landing patterns by species for the metier OTB_ MCD_70_99 (light pink colour = *Nephrops,* pink=monkfish and light blue colour = plaice).

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Trawl fisheries targeting small demersale fish (OTB_DEF<16_0_0)

The Danish bottom trawl fishery targeting sandell is in tons the largest fishery in Denmark. In 2008-2010 the average total landings from this metier were 260,000 t. The fishery first starts the 1 of April and last to 1 of August in years with high catches of smaller fish but ends later in years with larger fish. 99% of the landed weight arrives from sandell. The species is until 2011 sampled in three different ways 1) By harbour samples 2) real-time samples and 3) fisherman samples. The two first sample methods are conducted by the Danish control and information on precise fishing location can be difficult to obtain. Sample type 3) is a project developed with the Danish fishermen's organisation and here information on a haul by haul basis is provided and the qualities of the samples are much better. In 2011 the real-time samples was abounded due to change in the assessment. This metier will in IV +VIIId be merged with;

- OTM_DEF_<16 (14,890 t consisting of 95% sandell and 3% Norway pout).
- PTB_DEF_<16 (11,160 t consisting of 94% sandell and 5% sprat).
- PTM_DEF_<16 (560 t consisting of 94%sandell and 5% sprat).

Relative landing patterns by species (dark purple colour = sandell, light pink= Norway prout, grey = sprat) for the metier OTB_ DEF<16 (left) and OTM_ DEF<16 (right).

Relative landing patterns by species (dark purple colour = sandell, light pink= Norway prout, grey = sprat) for the metier PTB_ DEF<16 (left) and PTM_ DEF<16 (right).

The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied. Sampling will be stratified by quarter and subdivision. The assumption for the planned number of trip (III.C.3) is that the fishery is conducted all year around.

Trawl fisheries targeting small demersale fish (OTB_DEF_16-31_0_0)
The bottom trawl fishery targeting small demersale fish in the North Sea is a Norway pout fishery. In 2008-2010 the average total landings from this metier were 32,000 t. The catch is composed of 92% Norway pout, 2% sandell and 4% herring. This metier will in IV +VIIId not be merged with other metiers. Discard rates are

estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. For sampling purpose this metier is merged with;

- OTM_DEF_16-31 (6500t consisting of 93% Norway pout and 5% herring).
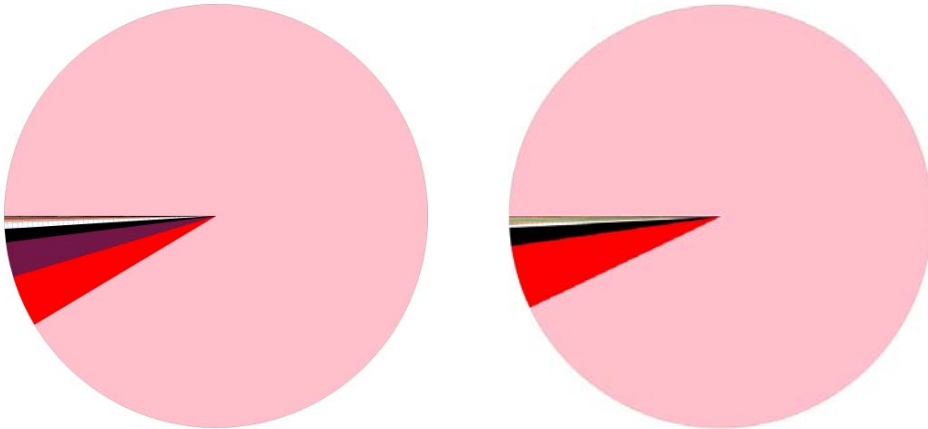
Relative landing patterns by species (light pink colour= Norway prout, red= herring) for the metier OTB_DEF_16-31(left) and OTM_DEF16-31 (right)
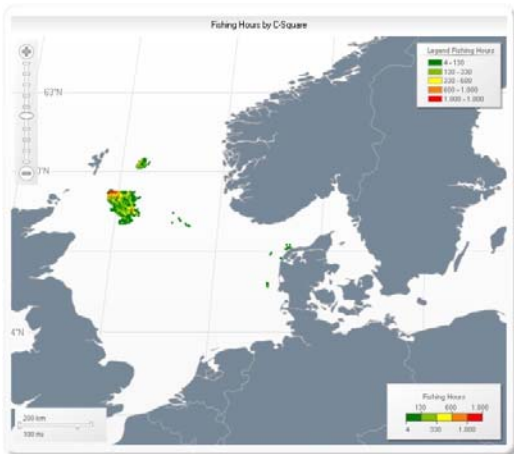
Danish VMS data for the same metier.

Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied.

Trawl fisheries targeting small pelagic fish (OTB_SPF_32-69_0_0)

The bottom trawl fishery targeting small pelagic fish in the North Sea is a mixed herring fishery. In 2008-2010 the average total landings from this metier were 20,220t. The catch is composed of 83% herring, 15% mackerel and 2% of the landed weight came from other species.;

- OTM_SPF_32-69 (25,360 t. consisting of 63% herring, 26% mackerel, 9% sprat and 2% of the landed weight came from other species) and
- PTM_SPF_32-69 (3,310t composed of 57% herring and 41% mackerel and 2% of the landed weight came from other species)
- PS__SPF_ALL (20,000t consisting of 85% mackerel and 14% herring)

will be merges with this metier due to similarities in catch composition. Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
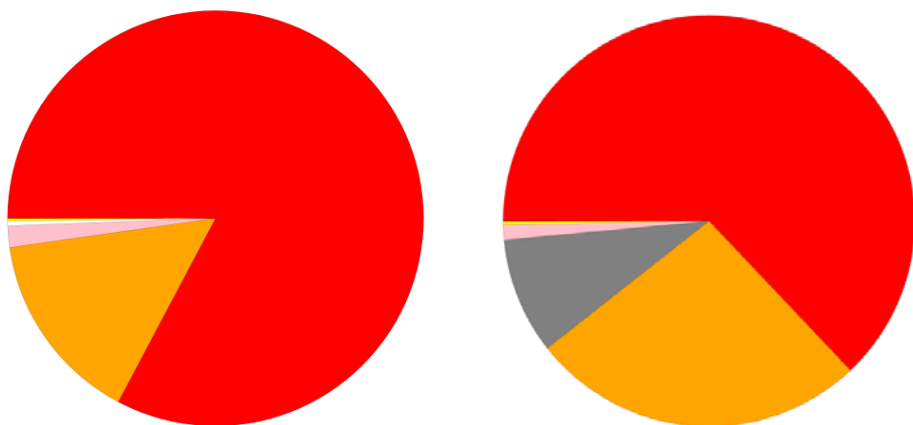
 Relative landing patterns by species (red colour = herring, orange =mackerel) for the metier OTB_SPF_32-69 (left) and OTM_SPF_32-69 (right)
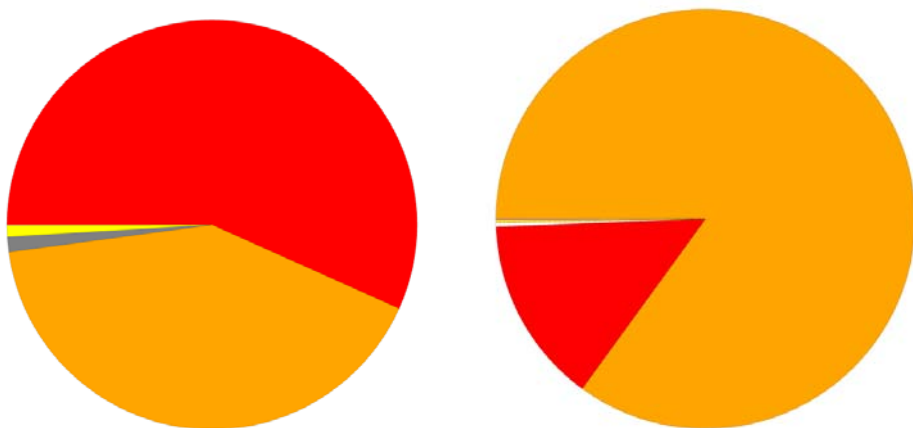
 Relative landing patterns by species (red colour = herring, orange =mackerel) for the metier PTM_SPF_32-69 (left) and PS__SPF_ALL (right)

Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied.

Trawl fisheries targeting small pelagic fish (PTM_SPF_16-31_0_0)
The bottom trawl fishery targeting small demersale fish in the North Sea is a sprat fishery. In 2008-2010 the average total landings from this metier were 62,800 t. The catch is composed of 94% sprat and 4% herring.

- OTM_SPF_16-31 (20,800 t. consisting of 97% sprat and 3% herring) and
- PTB_SPF_16-31 (6,650t. consisting of 88% sprat, 6% herring, 2% sandell and 4% of the landed weight came from other species)
- OTB_SPF_16-31 (14,000 t. consisting of 96% sprat and 3% herring)

Will be merges with this metier due to similarities in catch composition. Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
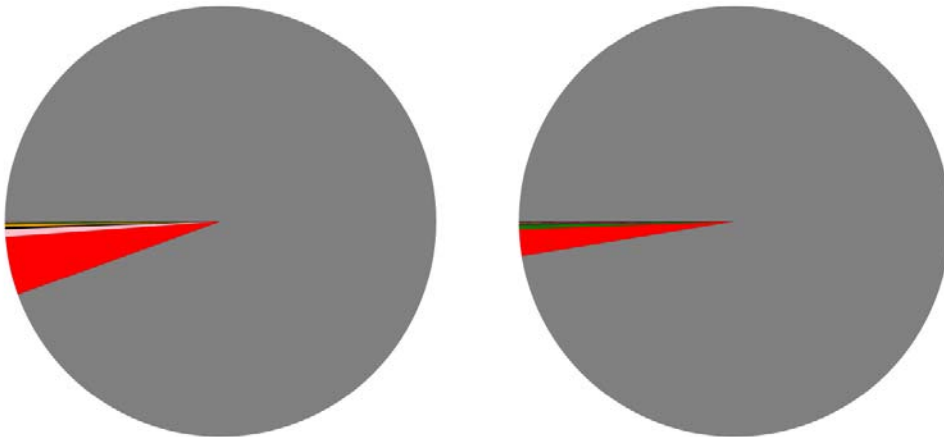
Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTM_SPF_16-31 (left) and OTM_SPF_16-31 (right).
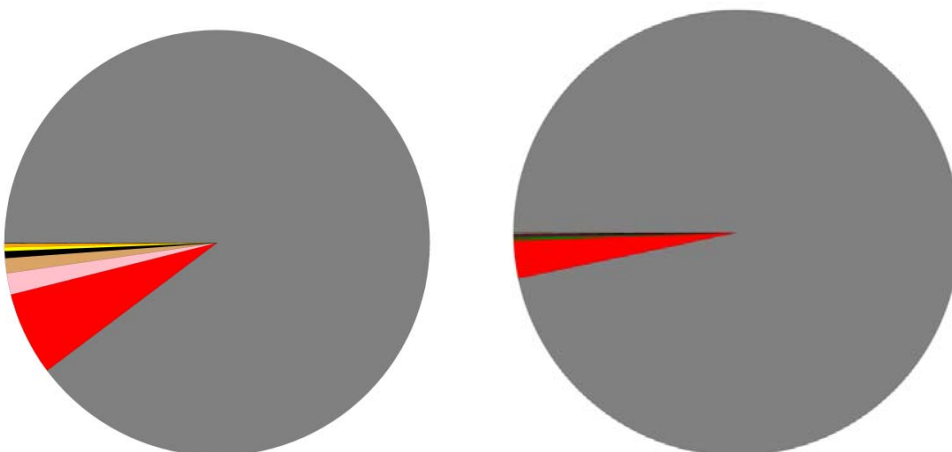
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Relative landing patterns by species (red colour = herring, grey = sprat) for the metier PTB_SPF_16-31 (left) and OTB_SPF_16-31 (right).

Discard rates are estimated to be below 10%. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied.

Danish Seine fisheries targeting demersale fish (SDN_DEF_>=120_0_0)

The Danish Seine fishery in IV+VIId is a mixed fishery with plaice as the main target. In 2008-2010 the average total landings from this metier were 1,610 t. consisting of 63% plaice, 28% cod and 9% of the landed weight came from other species. This metier is in IV+VIId merged with the less important seine metier with smaller mesh sizes;

- SDN_DEF_100-119 (270t. consisting of 76% plaice, 12% cod, 3% dab, 2% haddock and 2% witch flounder and 4% of the landed weight came from other species).

The metier has been included in the sea-sampling programme.
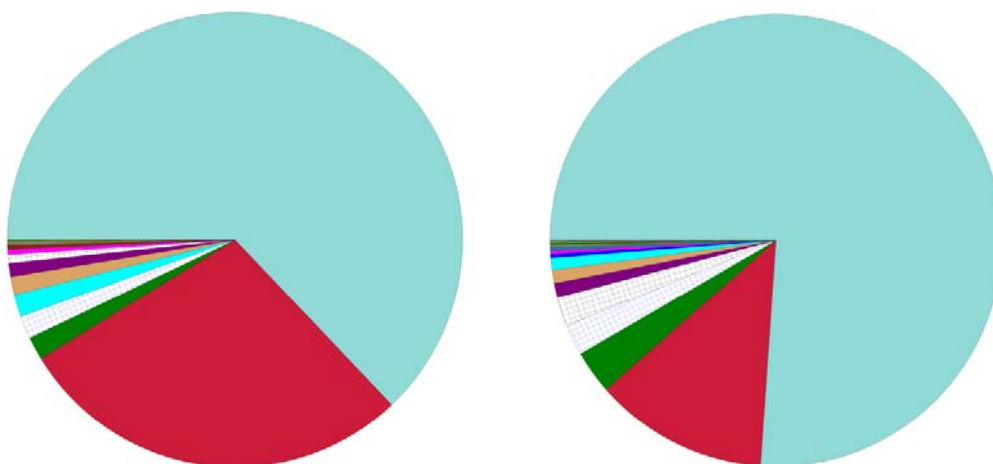
Relative landing patterns by species (light blue colour= plaice, red=cod and white squares= haddock)for the metier SDN_DEF_>=120 (left) and SDN_DEF_90-119 (right).
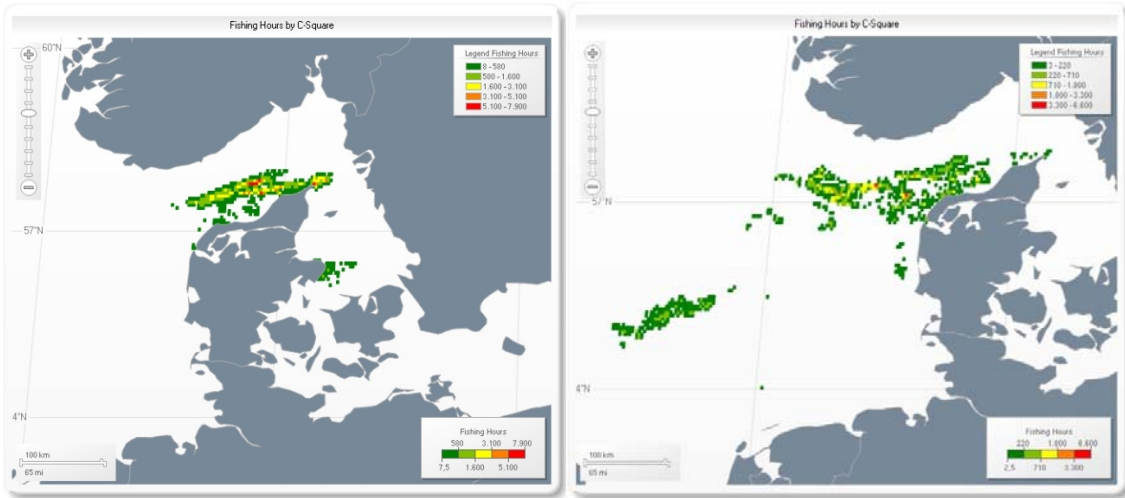
Danish VMS signals for the metier SDN_DEF_ 90-119 (left) and SDN_DEF_>120 (right).

The metier has been included in the sea-sampling programme. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 3 will be applied. Sampling will be stratified by quarter.

Beam trawl fisheries targeting demersale crustaceans (TBB_CRU_16-31_0_0)

This metier is exclusively landing the brown shrimp and in 2008-2010 the average total landings from this metier were 3200 t. This metier will in IV +VIIId not be merged with other metiers. The metier has been included in the sea-sampling programme since 2009. The metier will be sampled concurrently at sea throughout the fishing season.
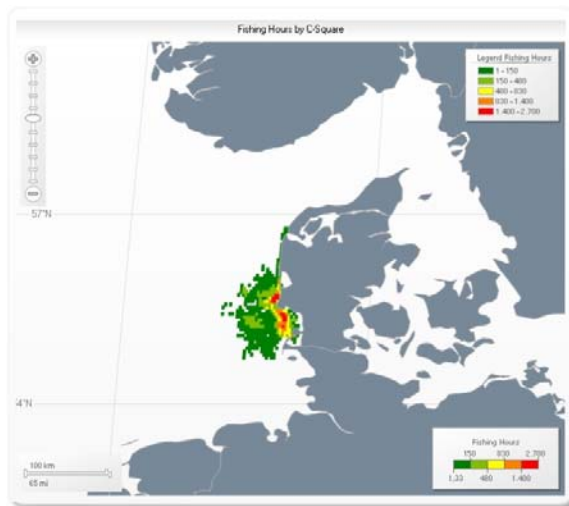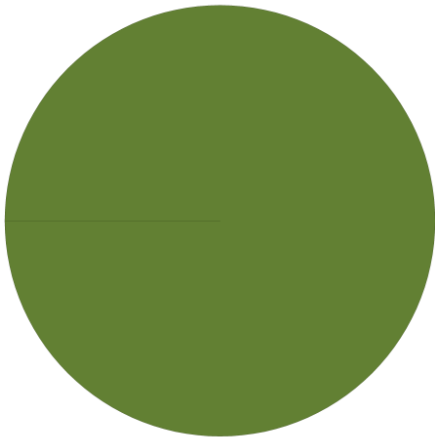
Relative landing patterns by species (green colour= brown shrimp) for the metier TBB_CRU_16-31 (left) and VMS data for the same metier (right).

This metier will in IV +VIIId not be merged with other metiers. The metier has been included in the sea-sampling programme since 2009. The metier will be sampled concurrently at sea throughout the fishing season. Sampling scheme 1 will be applied. Sampling will be stratified by quarter.
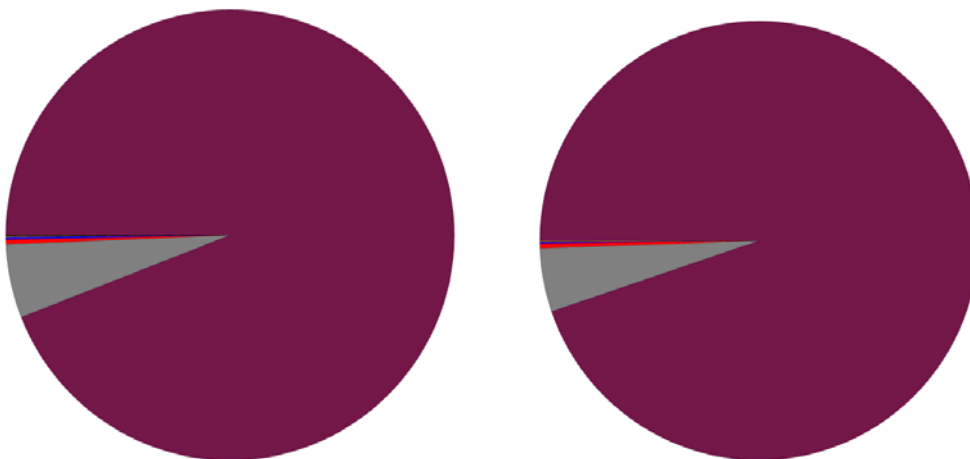
Beam trawl fisheries targeting demersale crustaceans (OTB_CRU_32-69_0_0)
The Danish bottom trawl fishery for crustaceans with mesh sizes between 32-69 mm is a deep water shrimp fishery. In 2008-2010 the average total landings from this metier were 200 t. Deep water shrimps were in average accounting for 72% of the total landings in weight. However some cod- fishes are landed as by-catches. Cod accounted for 4% of the landings and saithe for 10% , 4% monk, 3% plaice, 2% hake and 6% of the landed weight came from other species. This metier is in the North Sea not merged with other metiers. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples.
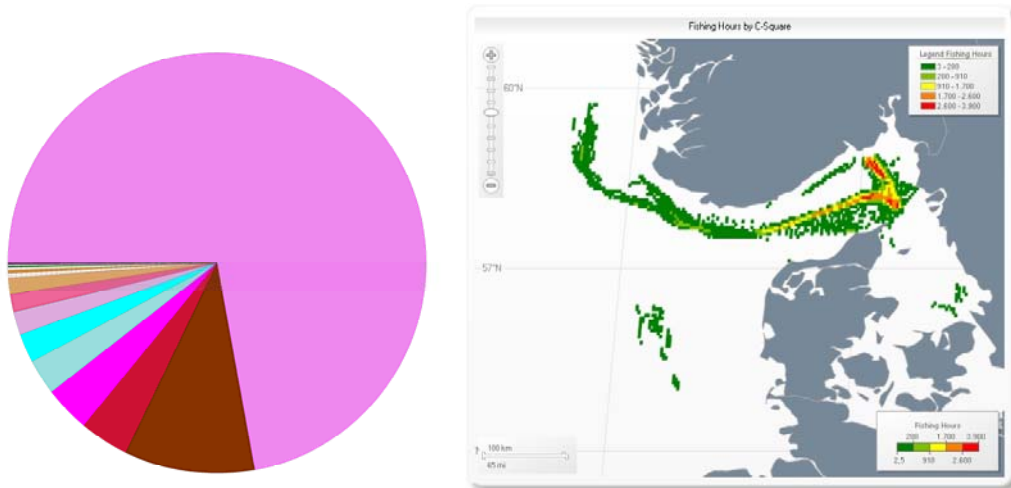
Figure XX. Relative landing patterns by species (purple= deep water shrimp, brown= saithe) for the metier OTB_CRU_32-69 (left) and Danish VMS signals for the same metier.

(c) Type of data collection

Stock specific sampling based on commercial size categories
In Denmark all landings are registered and recorded – meaning census data on landings (amount in weight and value by species and EU size grade). The Danish harbour sampling scheme is a Non-Probability Sample Survey, stratified by year, area, harbour, quarter, species and EU size grade. Concurrent samplings of Danish fisheries are conducted during at -sea sampling where both the discarded and the retained part of the catch are measured. During the harbours sampling the scheme also includes the commercial EU size sorting strata. Information on quantity of each species landed is recorded in the Danish first-hand buyer register, where data on catch area, size grades, value and vessel identity are also registered. The sampling scheme is further stratifies into quarter, and for each quarter there are at least two to five samples pr size grade group.

The scientific evaluated and acceptable sampling procedure as previously used for sampling landings (see section III.C.2) will be adopted for planning the 2011-2013 sampling program. If Denmark is going to use the concurrent sampling approach for landings it would increase the cost of the national programme significantly as the time between landing and actual sale is so short (less than one hour) that all fish have to be bought. Even though the fish subsequent is sold the difference between cost price and the sale price will be high.

Concurrent sampling of landings at markets

This sampling scheme will be applied for metiers where discard rates are expected to be low (industrial landings and landings of herring and mackerel). In the Kattegat, the Skagerrak, the North Sea and the Eastern Arctic this sampling strategy will be the primary strategy applied for trawls targeting small pelagic fish (e.g PTM_SPF_16-31_0_0).

Data will be collected by staff from DTU Aqua or staff from the DF by randomly sampling landings in harbours.

Sampling scheme 1 will be applied and information to be collected is total weight of landing by all species caught and length measurements are made for all species.

Concurrent sampling of catches at sea (at-sea sampling)

Sampling directed towards the estimation of discard was initiated in 1995 in the North Sea, the Skagerrak, the Kattegat and the Baltic Sea. The sampling has since 2002 been directed towards fisheries where discard occurred on a significant level. Based on sampling made from 1995 to 2000 it is verified that the discard rates obtained in the Danish gillnet fishery, the fishery using hooks and the small mesh size fishery are insignificant compared to the rest of the fisheries. Taking this into account and in order to maximize the level of certainty of the overall discard estimate the sampling was previously concentrated to the Danish fisheries shoving significant discard: demersal trawl (for fish and/or nephrops) and Danish seine. However, since fall 2009 discard rates on gill-netters have been monitored in the North Sea and it is planned to be conducted in the Baltic Sea as well in 2011-2013.

Within the selected metiers to be sampled the vessels for monitoring will more or less be randomly selected. In addition some considerations will be made in order to assure that different vessel sizes, different harbours and various durations of the fishing trips are covered.

The fishery performed in different areas differs considerably in respect to duration, number of station per trip and handling of the catch. In the North Sea trips are up to 10 days of duration, while trips of 1-2 days duration are common in the Kattegat and the Baltic Sea.

Because fisheries differ between areas different sampling procedures are applied. If possible, all biological information from the catch will be sampled from each station.

Those are:
  ➢ Total weight of discard and landing by all species caught.

  ➢ Separate length distributions of discard and landings by all relevant species caught.

  ➢ Otoliths and individual mean weight per cm-length group of selected discarded species.

In addition all relevant vessel, gear and geographical information will be recorded.

(d) Target and frame population

The commercial Danish data collected within the DCF has been dividing the sampling into strata in time (Quarters) and space (Subdivisions) to obtain a broad picture mirroring the activities of the metiers and/or

landings of the stocks. Furthermore we have increased the number of sampled trips/landings in relation to number of fish landed in the given fishery.

However in 2008-2010 ICES were hosting 3 workshops WKACCU, WKPRECISE and WKMERGE were Denmark participated and here it was concluded that a more systematic approach is needed to accurately be able to evaluate possible bias and precision in the data collection. Design and especially implementation of statistically sound catch sampling programmes is rather difficult and need thorough analysis and coordination between nations in order to be successful. The main reasons for the difficulties are the complexity in the metier approach, cluster effects and a range of logistical constrains such as sampling of very difficult obtained areas (harbours), refusal of participation of an observer or very bad working condition onboard some vessels. Furthermore, Denmark has to work towards avoiding over stratification as we are in the risk of having too many strata with very few data and thereby have to borrow biology from similar strata. This approach has also been highlighted at the ICES workshop as an approach that should be minimized. National implementation would benefit from transparent international discussions on assumptions and experiences, as suggested by ICES PGCCDBS 2010. Statistical tools available to analysis the data are also of great importance, however the newly developed COST tools can only handle data if the primary sampling unit is trip based.

In 2010 Denmark will start initiated the data catch sampling towards a more design based approach by defining sampling frames in the sea sampling programme as well as applying random sampling of primary sampling units. For this National Programme proposal it is premature to describe sampling designs, including sampling frames. The sampling frames described in table IIIC.4 may be revised during the programme period. The sampling frames are intended to cover all trips in a metier. The temporal frame (IIIC.4) shows how the different areas are sampled during certain seasons. Details on seasonal fishing pattern are in relevant cases included in the description of the different metiers.

(e) Sampling stratification and allocation scheme

The Danish sampling effort has been allocated based on prior knowledge of the metiers, importance of metiers compared to an international catch level and the importance of data in a stock assessment relation. Furthermore we will in 2010 start to evaluate and take into account the precision targets. Sampling effort is allocated to ensure that the number of trips sampled is at least one per month or is covering throughout the fishing season. A detailed analysis of the sampling precision has however been waiting for the finalisation of the COST project. The work has been initialised and is a part of the overall effort to improve our sampling designs in 2010. Expected number of sampled trips by metier is presented in table III.C.3.

Table III.C.5 shows sampling intensity of length measurements of all G1 and G2 species listed in Appendix VII. The Danish sampling strategy for metiers is aiming for a certain number of trips rather than targeting a certain number of individuals to be measured. In the sea sampling programme, Denmark takes random subsamples containing approximately:

For species with a large occurrence at the trip/haul:

Discards; 100 individuals / haul for cod and other species with a wide length frequency; 50 ind/haul for other species.

Landings; 100 individuals / size category for cod and other species with a wide length frequency; 50 ind /haul for other species.

for other species:

All available individuals within the trip/haul/sample

As the catch composition and volume in catch is not known beforehand, numbers of length measured individuals are impossible to predict and plan exactly. In table III.C.5 number of length measured individuals sampled in 2009 are listed to give an idea of sampling levels. Cells containing "0" means that the species was not caught and length measured in 2009 but could appear in future catches.

III.C.2 Estimation procedures

All metiers merged in section IIIC2 has been analysed according to the catch composition and can be found in more details in section IIIC1 (b). Each metier selected has been described and if more metiers are merged the catch composition for each metier has been described.

At the ICES WKISCON meeting 2008 Denmark presented a study (Folmer, 2008) on the sampling system used in Denmark and the statistical consequences. This study shows no significant differences in length or weight between samples from different fisheries within the same commercial EU size grade and within the same area. The sales-slips register can give information on the size distribution and the species composition of the catch. Together with the logbook data this information can be used to estimate the spatial and temporal distribution per species and size grade for each metiér. Subsequently the size grade landing data from the different metiérs can be partition into length or age distributions.

The results from this study confirm that the Danish sampling system do not have to be changed in order to meet the same objectives as for concurrent sampling.

For detailed explanation see Baltic section III.C.2

III.C.3 Data quality evaluation

Almost all landings in Denmark are landed to central buyers or auctions halls. Every year the initial sampling scheme is established based on the experiences from the previous year's landings and discard estimates. The sampling effort is expressed in number of trips at sea onboard commercial vessels carrying out regular fishery and number of harbour samples (including length frequency and age distribution) from each commercial sorting landed of all species landed. The scheme is stratified on métiers lvl6, subdivision and quarter. For harbour sampling the sampling scheme is further stratified on species and commercial sorting. If requested by the DCF and if the information isn't obtained during scientific surveys, maturity and sex ratio are obtained as well. This scheme is distributed to key person employed by the DTU Aqua each being responsible for the everyday organization of the sampling in a defined subarea all together covering all Denmark.

The everyday organizers are in continuous contact with the fishermen and the auction halls and get information about deviations from last year scheme (decrease /increase of existing fisheries or emerging of new fisheries). The initial sampling scheme is adjusted accordingly but still under the constrains of the total number of samples.

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A very important spin-off from the discard sampling at sea is the opportunity to intensify the communication with the Danish Fishermen's organisations and the individual fisherman providing a natural possibility to explain and overcome the misunderstandings often existing between the fishermen and the fisheries biologists. This has already involved changes toward a more constructive and responsible attitude by the fishermen and the Fishermen's Organisation.

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All raw data are punched into the national database. Range and value checks are performed in connection with the store in the national database. If passed, the data are raised from sampling level to station level by documented automatic procedures in the national database. On routine basis, the data are then extracted and uploaded to the regional database, FishFrame. Here the raising from station level to total level and the data extrapolation is carried out following documented and consistent procedures (for detailed description, see FishFrame raising and data extrapolation part 1 and part 2 documentation).
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- how to merge metiers

- analysis of necessary sampling levels (no. of trips and length measurements) to reach certain precision levels (length frequencies, discards etc) and

- cost-benefit analysis of sampling allocation to different metiers.

III.C.4 Data presentation

The official landings statistics and well as the processing of fish and shell fish samples is finalized in the beginning of the following year of sampling. The main data end-users for data related to the metier based sampling have until now been expert working groups the ICES WGDEEP, WGECO, AFWG, WGNSSK, WGCSE, WGEF, WGMIXFISH, WGWIDE, WKSAN, WGEEL, WGNEW and STECF SGMOS. The Danish data will be provided to ICES and to STECF to the set deadlines. This means that the data can be used to support scientific analysis as the basis for advice to fisheries management. Data to be used by STECF will be ready approximately 4 month later than the end of the sampling year. For other end-users data will be made available according to the provision laid down in Council Reg. 199/2008 article 18.

Data will be available at:

- All biological data will be available at a detailed level (sample level).

- At sea-observer data will be available at a detailed level (trip level).

- Research survey data will be available at a detailed level (haul level).

- Catch data per species will be available per rectangle per month.

III.C.5   Regional coordination

Denmark has for several years had cooperation and task sharing with Sweden, Germany, Ireland, Belgium and the Netherlands. Furthermore, Denmark has worked actively at the RCM in the North Sea and Eastern Arctic for increased coordination towards shared regional sampling programme.

Bilateral agreements have been made between Denmark and other MS are attached as Appendix 1 to Appendix 6.

Denmark has tried to apply to all recommendations made by the Regional Data Collection Meetings (RCM's) during the years since they were established in 2004. Below is a list of relevant recommendations each request is accompanied by a comment on how Denmark has applied to the request. Few requests have turned out not to be relevant at the time of realization as management decisions have changed the relevance of the recommendation. The introduction of a regional data base/warehouse, the FishFrame, will in many ways solve the problems experienced with ineffective regional coordination by providing basic sampling and analysis results and real time information about sampling status and by that make regional coordination much easier.

Metier related variables

Source	Recommendation	Danish action

RCM NS&EA 2011 Recommendations Concurrent sampling	RCM NS&EA is of the opinion that the sampling methods for obtaining catch compositions be reviewed before the implementation of the new DCF.	At present not relevant to the Danish NP for 2012
RCM NA 2011 Recommendation 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. − The RCMs should perform an annual analysis on landings in foreign countries and conclude where bilateral agreements need to be made. MS should set up agreements, fixing the details of sampling, compilation and submission of data in each case when it is indicated by the RCM that a bilateral agreement is needed. Standard output algorithms to enable analysis of compiled data should be included in FishFrame. − 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.	Denmark will follow this recommendation.
RCM NA 2011 Recommendation Metier descriptions	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.	
RCM NS&EA 2011 Recommendation Regional agreements on framework for the analysis of landings abroad	In order to identify were bilateral agreements on sampling of foreign landings have to be set up, the RCM NS&EA agreed on a common understanding of thresholds for sampling. It was agreed • should MS landings be less than 200 tonnes (incl. landings in MS) there	Denmark follows this recommendation.

		should be no sampling requirement, this should not be applied to stocks where there is a low TAC • RCM should analyse the landings of MS and, were suitable, resolve sampling of landings abroad and obtain agreements at the RCM If this is not possible a bilateral agreement should be implemented between the MS concerned • that the analysis on sampling agreements are needed, should be done annually by the RCM using landing data from the previous year. • the agreement has to include descriptions on how the data should be collected and who is responsible to process the data	

III.C.6 Derogations and non-conformities

For justification of merged metiers please see section III.C.1 where each merging of metiers is listed.

Denmark request for derogations for at sea-sampling sampling for the following metiérs:

Metiérs Level 6	Fishing ground	Reason for applying for derogation
OTM_SPF_32-69_0_0	27.I+II	This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, discarding occurs seldom however if it occurs discarding is in large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTB_SPF_32-69_0_0	27.IIIaN	This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, when discarding it occurs seldom but when discarding it is large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this

		fishery to discard the catches when it has been taking onboard.
OTB_DEF_<16_0_0	27.IIIaN	This is a fishery for sandeel. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTM_SPF_16-31_0_0	27.IIIaS	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
PTM_SPF_32-69_0_0	27.IIIaS	This is a fishery for herring. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
GNS_DEF_100-119_0_0	27.IV+VIId	This is a sole fishery with a very small amount of annual landings accounting for below 200 t. in average in the reference period. To sample this metier with observers would be much cost consuming compared to the very small fishery.
GNS_DEF_>=220_0_0	27.IV+VIId	This is a turbot fishery with large mesh sizes. It is a relatively small fishery 282t in average and due to the very large mesh sizes it is believed to have relatively little discard. To sample this metier with observers would be much cost consuming compared to the very small fishery.
OTB_DEF_<16_0_0	27.IV+VIId	This is a fishery for sandeel. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. There is a cooperation between the industry and DTU Aqua and samples a collected by haul. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.

OTB_DEF_16-31_0_0	27.IV+VIId	This is a fishery for Norway pout. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTB_SPF_32-69_0_0	27.IV+VIId	This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, when discarding it occurs seldom but when discarding it is large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
PTM_SPF_16-31_0_0	27.IV+VIId	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.

NORTH EAST ATLANTIC

III.C.1   Data acquisition

Primary data collected under the Danish programme will be stored in the following databases:

xi.   Vessel register. Data on fishing capacity. (FD)

xii.   Logbook database. Data on origin of catches and on effort. (FD)

xiii.   Sales notes database. Data on quantities landed and prices. (FD)

xiv.   Species composition database. Data on species composition in landings for industrial purposes. (FD)

xv.   Biological database. Data on discards and biological parameters. (DTU Aqua)

In order, for the three involved institutes (DTU Aqua, FOI and DST), to use the same primary data on capacity, effort, and geographical distribution of the origin of the landings a common database will be produced every year, the Danish Fisheries Analyses Database (DFAD) by DTU Aqua. This database is containing data from the register on Danish fishing vessels, Danish logbook information, the catch area declarations database together with data from the Danish sales notes database. As the data from these databases are merged it is possible to categorise each landing in one fleet segment, in one fishery etc. This database contains most of the information requested in research projects and in relation to fisheries management. The DFAD is quarterly and yearly updated. The design and development of the database is made in a co-operation between the three above mentioned institutes.

(b) Codification and naming convention

The fishing gear codes used for codification and naming includes more codes than agreed by the RCM's. The following steps have been used when metier definition has been made:

7. For each trip Level 1, Level 2, Level 3 and Level 4 of the metriér matrix is stated according to the gear used in the logbook.

8. For each trip the DFAD information (where logbook and sales slip information is merged) is used to rank the species by landed value. The step is used to determine Level 5 of the metier matrix.

9. Gear mesh size and sorting devise is used to determine metriér matrix Level 6.

Trips without match of sales slips and logbooks are omitted from the ranking as information to assign these trips to level 6 is not available. Furthermore, for vessels with loa (length over all) of less than 8 m. no logbook information is available. These trips have been characterized as "Trips out of matrix".

For some logbooks information is not adequate or missing e.g. missing mesh size and it is therefore not possible to assign these trips to level 6 of the matrix. These trips are categorized as "Trips out of matrix". The total landings of "Trips out of matrix" are limited and below 1%.

If fishing ground/area changed within trip, then effort (days_at_sea) per trip has been weighted within fishing grounds/areas by catch size of all species.

It should be mentioned when ranking the landed value by species (step 2) , no "mixed crustaceans and demersal fish" or no "mixed cephalopods and demersal fish" for Level 5 is used by Denmark.

(c) Selection of metier to sample

Information from the DFAD data base has been used to define the metiers to sample and the variables concerning metriér matrix Level 1-6. Selection of métiers based on effort, landings and value is based on data stored in the DFAD. Target species is defined as the species contributing most to the value per trip.

The Danish sampling system has been changed, see the Baltic section.

Outcome of ranking the Danish fishery in the North Atlantic region is given in Table III.C.1. The metiérs to be sampled and metiérs to be grouped are given in Table III.C.3.

Even though a metiér according to the ranking guidelines has been selected to be sampled, not all metiérs meeting these criteria have been sampled. Reasons for deviation of the guidelines are given in section III.C.6.

The small scale fishery is not conducted in this area by the Danish fishermen and are therefore not included in the sampling program.

Fishing ground North Atlantic

VII-VIII
Trawl fisheries targeting small pelagic fish (OTM_SPF_32_69_0_0)
The Danish bottom trawl fishery targeting horse mackerel are landing 2.040 t. The landings are 99.9% horse mackerel and 0.1% mackerel. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied

Relative landing patterns by species (red colour=horse mackerel) for the metier OTM_SPF_32-69

VII-VIII
Trawl fisheries targeting small pelagic fish (OTM_DEF_32_69_0_0)
The Danish bottom trawl fishery targeting horse mackerel are landing 18721 t. The landings are 100% Boarfish. The metier will be sampled concurrently in harbours/at markets by purchasing unsorted samples. Sampling scheme 1 will be applied
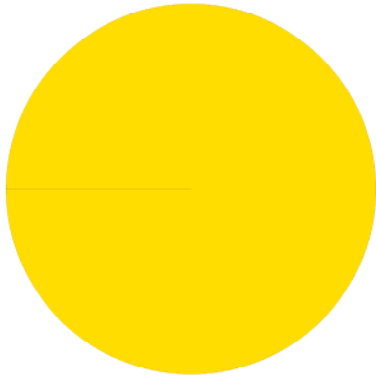
Relative landing patterns by species (yellow colour=boarfish) for the metier OTM_DEF_32-69

(d) Type of data collection

Stock specific sampling based on commercial size categories

In Denmark all landings are registered and recorded – meaning census data on landings (amount in weight and value by species and EU size grade). The Danish harbour sampling scheme is a Non-Probability Sample Survey, stratified by year, area, harbour, quarter, species and EU size grade. Concurrent samplings of Danish fisheries are conducted during at -sea sampling where both the discarded and the retained part of the catch are measured. During the harbours sampling the scheme also includes the commercial EU size sorting strata. Information on quantity of each species landed is recorded in the Danish first-hand buyer register, where data on catch area, size grades, value and vessel identity are also registered. The sampling scheme is further stratifies into quarter, and for each quarter there are at least two to five samples pr size grade group.

The scientific evaluated and acceptable sampling procedure as previously used for sampling landings (see section III.C.2) will be adopted for planning the 2011-2013 sampling program. If Denmark is going to use the concurrent sampling approach for landings it would increase the cost of the national programme significantly as the time between landing and actual sale is so short (less than one hour) that all fish have to be bought. Even though the fish subsequent is sold the difference between cost price and the sale price will be high.

Concurrent sampling of landings at markets

This sampling scheme will be applied for metiers where discard rates are expected to be low (industrial landings and landings of herring and mackerel). In the Kattegat, the Skagerrak, the North Sea and the Eastern Arctic this sampling strategy will be the primary strategy applied for trawls targeting small pelagic fish (e.g PTM_SPF_16-31_0_0). Samples will be collected by staff from DTU Aqua or staff from the DF by randomly sampling landings in harbours.
Sampling scheme 1 will be applied and information to be collected is total weight of landing by all species caught and length measurements are made for all species.

Concurrent sampling of catches at sea (at-sea sampling)

Sampling directed towards the estimation of discard was initiated in 1995 in the North Sea, the Skagerrak, the Kattegat and the Baltic Sea. The sampling has since 2002 been directed towards fisheries where discard occurred on a significant level. Based on sampling made from 1995 to 2000 it is verified that the discard rates obtained in the Danish gillnet fishery, the fishery using hooks and the small mesh size fishery are insignificant compared to the rest of the fisheries. Taking this into account and in order to maximize the level of certainty of the overall discard estimate the sampling was previously concentrated to the Danish fisheries shoving significant discard: demersal trawl (for fish and/or nephrops) and Danish seine. However, since fall 2009 discard rates on gill-netters have been monitored in the North Sea and it is planned to be conducted in the Baltic Sea as well in 2011-2013.

Within the selected metiers to be sampled the vessels for monitoring will more or less be randomly selected. In addition some considerations will be made in order to assure that different vessel sizes, different harbours and various durations of the fishing trips are covered.

The fishery performed in different areas differs considerably in respect to duration, number of station per trip and handling of the catch. In the North Sea trips are up to 10 days of duration, while trips of 1-2 days duration are common in the Kattegat and the Baltic Sea.

Because fisheries differ between areas different sampling procedures are applied. If possible, all biological information from the catch will be sampled from each station.

Those are:
> Total weight of discard and landing by all species caught.

> Separate length distributions of discard and landings by all relevant species caught.

> Otoliths and individual mean weight per cm-length group of selected discarded species.

In addition all relevant vessel, gear and geographical information will be recorded.

(d) Target and frame population

The commercial Danish data collected within the DCF has been dividing the sampling into strata in time (Quarters) and space (Subdivisions) to obtain a broad picture mirroring the activities of the metiers and/or landings of the stocks. Furthermore we have increased the number of sampled trips/landings in relation to number of fish landed in the given fishery.

However in 2008-2010 ICES were hosting 3 workshops WKACCU, WKPRECISE and WKMERGE were Denmark participated and here it was concluded that a more systematic approach is needed to accurately be able to evaluate possible bias and precision in the data collection. Design and especially implementation of statistically sound catch sampling programmes is rather difficult and need thorough analysis and coordination between nations in order to be successful. The main reasons for the difficulties are the complexity in the metier approach, cluster effects and a range of logistical constrains such as sampling of very difficult obtained areas (harbours), refusal of participation of an observer or very bad working condition onboard some vessels.

Furthermore, Denmark has to work towards avoiding over stratification as we are in the risk of having too many strata with very few data and thereby have to borrow biology from similar strata. This approach has also been highlighted at the ICES workshop as an approach that should be minimized. National implementation would benefit from transparent international discussions on assumptions and experiences, as suggested by ICES PGCCDBS 2010. Statistical tools available to analysis the data are also of great importance, however the newly developed COST tools can only handle data if the primary sampling unit is trip based.

In 2010 Denmark will start initiated the data catch sampling towards a more design based approach by defining sampling frames in the sea sampling programme as well as applying random sampling of primary sampling units. For this National Programme proposal it is premature to describe sampling designs, including sampling frames. The sampling frames described in table IIIC.4 may be revised during the programme period. The sampling frames are intended to cover all trips in a metier. The temporal frame (IIIC.4) shows how the different areas are sampled during certain seasons. Details on seasonal fishing pattern are in relevant cases included in the description of the different metiers.

(e) Sampling stratification and allocation scheme

The Danish sampling effort has been allocated based on prior knowledge of the metiers, importance of metiers compared to an international catch level and the importance of data in a stock assessment relation. Furthermore we will in 2010 start to evaluate and take into account the precision targets. Sampling effort is allocated to ensure that the number of trips sampled is at least one per month or is covering throughout the fishing season. A detailed analysis of the sampling precision has however been waiting for the finalisation of the COST project. The work has been initialised and is a part of the overall effort to improve our sampling designs in 2010. Expected number of sampled trips by metier is presented in table III.C.3.

Table III.C.5 shows sampling intensity of length measurements of all G1 and G2 species listed in Appendix VII. The Danish sampling strategy for metiers is aiming for a certain number of trips rather than targeting a certain number of individuals to be measured. In the sea sampling programme, Denmark takes random subsamples containing approximately:

For species with a large occurrence at the trip/haul:

Discards; 100 individuals / haul for cod and other species with a wide length frequency; 50 ind/haul for other species.

Landings; 100 individuals / size category for cod and other species with a wide length frequency; 50 ind /haul for other species.

for other species:

All available individuals within the trip/haul/sample

As the catch composition and volume in catch is not known beforehand, numbers of length measured individuals are impossible to predict and plan exactly. In table III.C.5 number of length measured individuals sampled in

2009 are listed to give an idea of sampling levels. Cells containing "0" means that the species was not caught and length measured in 2009 but could appear in future catches.

III.C.2 Estimation procedures

At the ICES WKISCON meeting 2008 Denmark presented a study (Folmer, 2008) on the sampling system used in Denmark and the statistical consequences. This study shows no significant differences in length or weight between samples from different fisheries within the same commercial EU size grade and within the same area. The sales-slips register can give information on the size distribution and the species composition of the catch. Together with the logbook data this information can be used to estimate the spatial and temporal distribution per species and size grade for each metiér. Subsequently the size grade landing data from the different metiérs can be partition into length or age distributions.

The results from this study confirm that the Danish sampling system do not have to be changed in order to meet the same objectives as for concurrent sampling.
For detailed explanation see Baltic section III.C.2

III.C.3 Data quality evaluation

Almost all landings in Denmark are landed to central buyers or auctions halls. Every year the initial sampling scheme is established based on the experiences from the previous year's landings and discard estimates. The sampling effort is expressed in number of trips at sea onboard commercial vessels carrying out regular fishery and number of harbour samples (including length frequency and age distribution) from each commercial sorting landed of all species landed. The scheme is stratified on métiers lvl6, subdivision and quarter. For harbour sampling thesampling scheme is further stratified on species and commercial sorting. If requested by the DCF and if the information isn't obtained during scientific surveys, maturity and sex ratio are obtained as well. This scheme is distributed to key person employed by the DTU-AQUA each being responsible for the everyday organization of the sampling in a defined subarea all together covering all Denmark.

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Due to the finalisation of the COST project and training workshops Denmark will prioritise this analytical tool to increase quality and knowledge of quality in our sampling. Furthermore, it is planned that the COST programmes will be implemented in the FishFrame data warehouse in order to analyse the collected data on a regional/fishing ground and international level. The merging of COST facilities into FishFrame will provide the possibilities to make scientific analysis on:

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III.C.4 Data presentation
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ready approximately 4 month later than the end of the sampling year. For other end-users data will be made available according to the provision laid down in Council Reg. 199/2008 article 18.

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III.C.5   Regional coordination

Denmark has for years had cooperation and task sharing with Ireland and Scotland. Furthermore, Denmark has worked actively at the RCM in the North Sea and Eastern Arctic for increased coordination towards shared regional sampling programme.

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III.C.6 Derogations and non-conformities

No discard occurs in the Danish fisheries carried out for this region. The fisheries carried out are historically the blue whiting fishery and a limited fishery for horse mackerel. In 2009 no blue whiting fishery took place. Therefore, Denmark request for derogation for discard sampling for this region.

III.D Biological - Recreational fisheries

Anglers - domestic as well as tourists - between 18 and 65 years have to purchase a license when fishing in Danish waters. The licenses are personal and non-transferable. Legal reasons for angling without a license are: 1) persons younger than 18 years of age, 2) persons older than 67 years, 3) Private landowners fishing in their own waters, 4) exclusively put & take fishers.

According to the official statistics 160,186 persons that have registered for a whole year held such a license in 2008. Persons that have a license for a day or week are additional to the 38,281 persons. These figures are for all regions in Denmark.

All passive gear fishers above 16 years of age using gillnet or fykenets have to pay a license. If you hold a license it is allowed to fish with 6 passive gears (traps, gillnets or long lines. According to the official statistics 35,221 persons (all Danish regions) had a license for recreational fishery with passive gears in 2008.

Baltic

III.D.1 Data acquisition
Salmon

The recreational fishery for salmon in the Danish waters is mainly a trolling fishery taking place around the island of Bornholm, especially to the east and north of Bornholm in ICES Sub-division 25. In recent years catches have also been reported further west in the Baltic. The troll-fishing season starts in September and ends in the month of May. In addition to this, a fishery with fixed hook lines set for salmon and gill-nets set for trout by non-professional residents on the island Bornholm takes place. This fishing mainly takes place in late autumn and early winter.

The recreational fishery is partly organized in local anglers associations (both on Bornholm and on the Island Zealand), and boat rental companies in small harbours at the coast of Bornholm. Some fishing by unorganized tourist fishermen from both the Danish mainland and from foreign countries, arranging travel and boat transport by themselves, also takes place. A few times every year fishing competitions are organized with 150 – 200 boats participating.

The catches in the recreational fishery are not officially registered in Denmark. In previous years it was estimated that the total catch was approximately 3000 individuals.

Denmark will in 2010 as in previous years estimate the total fishing effort (i.e. the number of boat-days) by collecting information from local anglers, boat rental companies, the ferry company servicing Bornholm and from results from fishing competitions. From selected anglers information on the average catch-per-unit-effort (CPUE) will be collected, and from this the total catch by troll fishing will be estimated. Previous attempts on collecting information by questionnaires from a larger part of the anglers did not prove to be efficient, as the response was very poor.

The catch of salmon by non-professionals using fixed hook-lines and nets set for trout has previously been very uncertain. For the year 2010 Denmark will try to gather information on the effort (number of hooks and nets used) from the local Fisheries Inspectors and on the average CPUE from interviews with selected fishermen. Based on these figures the total catch will be estimated.

Cod

Recreational fishery in Denmark with cod as target species or as by-catch in fishery for other target species is to some extent conducted by non-professional fishermen. The recreational fishery includes both fishing with rods

and passive gears. According to Danish law it is illegal for recreational fishermen to sell their catches. A fishing license has to be obtained by the recreational fishermen before conducting any fishery in fresh or marine water if the fisherman is above the age of 16 or below 65 years.

The fishery is performed on commercial organized trips with vessels dedicated to the purpose or by individuals fishing from the coastline or from private boats near the shores. A small part of the anglers are organized in local regional recreational fishermen associations under the umbrella of the Danish Sports fishing Society (Dansk Sportsfiskerforbund). These more than 200 associations cover typically marine fishery as well as freshwater fishery. An unknown number of other anglers associations are not connected to the Danish Sports fishing Society and a significant number of the anglers are not member of any association.

Eel

The main "target" for the recreational fishermen using passive gears is eel, flatfishes and herring, but some fishermen are also fishing for cod. It is known that there are by-catches of cod in especially the fishery for eel- and flatfishes.

(a) Type of data collection

Two questionnaires, the Omnibus and the Permit, have been developed by Statistic Denmark and DTU Aqua for a combined telephone and internet survey. The interviews will be conducted by Statistic Denmark who holds the expertise in this form of investigations. The questionnaire has been tested on a subgroup of fishermen with permit, to optimize the process and change questions that potentially could lead to bias.

Omnibus

Telephone interview rounds is planned to be conducted twice a year. The Omnibus is a regular monthly interview conducted by Statistic Denmark to gather all kind of information, such as political view, black work etc. The recreational fishery questions are only a minor part of this interview. Respondents are selected by telephoning a random non-mobile number. The interview will be conducted with that person within the household with birthday last. Only citizens between 16 and 74 will be included. A total of 900 to 1000 will be interviewed at the two rounds. The first objective is1) to estimate the numbers of anglers and passive gear fishermen and 2) to estimate the numbers that are fishing illegally. Therefore fishermen not holding a license are asked for their reason. There are several legal exemptions for holding the compensatory license for angling fishing see section 1.3. Passive gear fishers older than 16 years do not have any legal excuse for not holding a permit when fishing in salt water.

Furthermore respondents will be asked for effort in fishing days to be able to estimate if people fishing without a permit are doing it with same effort as people with a permit. These questions would provide the needed information for calculating the fraction of illegal fishermen and the effort they fished with. Respondent will also be asked about their fishing pattern outside Denmark, such as countries they had visit for fishing.

Permit

A second interview phase will be based on people that are holding a valid license at the time of the interview. It is possible to contact persons holding a permit directly as names and public number is available. A detailed questionnaire can be answered on web or by a telephone interview. This interview will provided detailed information on the fishing carried out and the catches taken.

To estimate catches by managing areas the respondents will be asked within which areas and quarters they have been fishing. The areas operated in this investigation are; The North Sea, Skagerrak, Kattegat, The Sound, the Belt Sea, The Limfjord and the Eastern and Western Baltic Sea (Fig. 1).
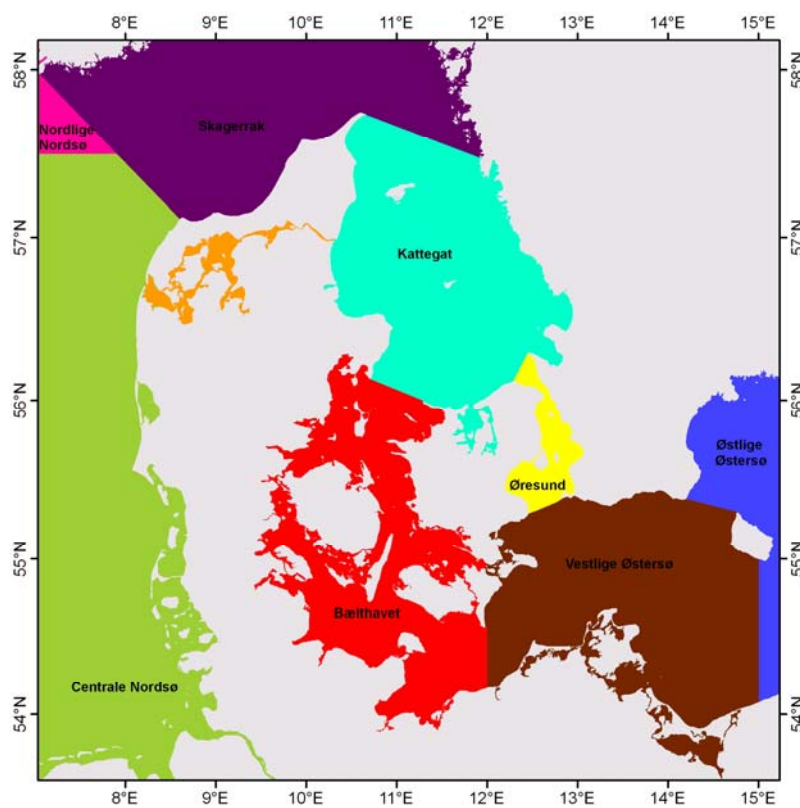
Fig. 1. Area definition used in the interview survey. Green: The North Sea, purple: Skagerrak, light blue: Kattegat, orange: Limfjord, yellow: The Sound, red: The Belt Sea, brawn: The western Baltic sea and blue; the eastern Baltic Sea.

(b) Target and frame population

Approximately 5.5 million people reside in Denmark; 2.5 million on the mainland and the rest on islands (source: Statistic Denmark, www.dst.dk). The coastline of Denmark is 7013 km long and no citizen lives more than 50 km from the nearest coast. Therefore, recreational fishing in marine waters is an important outdoor leisure activity in Denmark. In 1997, 16.5% of the Danish public considered themselves as anglers and 12.5 % claimed to have been fishing within the last year (Bohn and Roth, 1997). Further, it was found that 25% fished in

streams, 30 % in lakes, 27% in put & take ponds but the majority of 73% answered marine waters. An economic validation of the recreational fishery underline the importance of recreational fishery in Denmark, as it was found that the Danish willingness to pay for the fishing is among the highest for the Nordic countries (Roth et al., 2001; Toivonen et al., 2004).

Recreational fishing in Danish coastal waters differs from what is observed in many other countries outside of Europe, in the sense that two major and very different categories of fishing can be identified. The first one is referred to as the passive gear fishing throughout this rapport. This is carried out using stationary gear such as gillnet and fykenets. The second leisure based fishing in saltwater is angling.

Table 7. Numbers of anglers and fishermen using passive gear permits issued during 1999 to 2009. In 2004 no data is available.

	1999	2000	2001	2002	2003	2005	2006	2007	2008	2009
Anglers	150526	151529	156769	150925	152534	160942	156474	160664	160186	156000[*]
Passive gear	33575	31709	33715	33888	33516	33430	34277	33787	35221	34000[*]

[*] Approximate numbers

(c) Data source

Denmark has planned a sampling scheme for the collection from anglers and recreational fishermen in 2011-2013. A study started in October 2009 and is to be carried out using telephone surveys of random selected individuals having a fishing licence, inquiries to the local recreational fishery associations, inquiries to the organizer of commercial recreational fishing trips and by use of official statistics (Statistics Denmark).

- Telephone interview covering a representative part of the Danish population to scale the numbers of people fishing without a license.
- Telephone interview with a representative part of the fishermen holding a angler license to quantify the amount of cod fished in the different stock units in Danish waters.
- Telephone interview with a representative part of the fishermen holding a recreational license to quantify the amount of cod and ell fished in the different stock units in Danish waters.

On the initiative of the Danish Organization for Amateur Fishermen and the Danish Association of Recreational Fishermen, a number of gillnet and/or trap fishermen has since 2002 agree on reporting their catches to DTU-Aqua. In 2008 a total of 75 fishermen were engaged in the project fishing either with standard gillnet and/or a standard trap. Geographical these 75 fishermen cover most of the Danish coastal areas, see figure 2. Exceptions are; a low coverage along the West coast of Jutland and a total lack of coverage on Bornholm and along the Wadden Sea coast. If weather conditions allows, Fishermen engaged in the project will as a minimum perform fishery with either three gillnets 1-3 times a month and/or three traps 5 times a month. Fishing takes place on a fixed position chosen by the fishermen prior to the first registration and will not be change during the reporting period. The gears are provided by DTU-Aqua to ensure that the same gears are used in all areas. All fish caught are identified to species, counted and length measured. In cases of a high catch an average and maximum length might be reported instead of individual length.
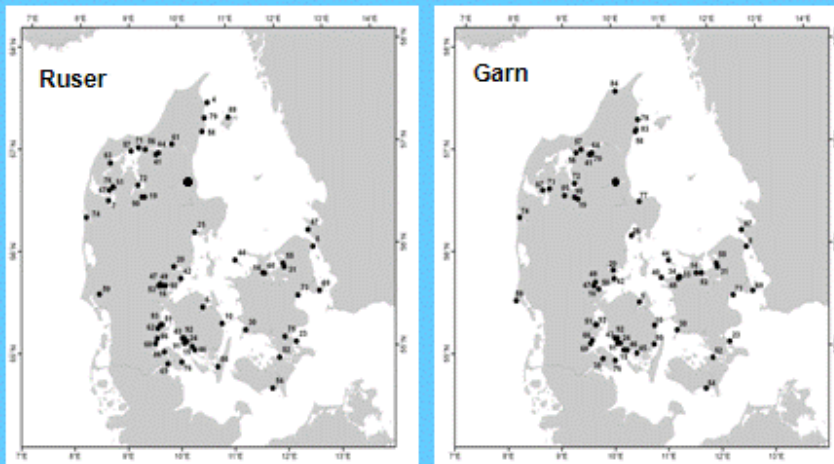
Fig. 2. Map showing the coverage of fishing positions 2008-2010. Map at left shows position of traps and the right map shows position of gillnets.

(d) Sampling stratification and allocation scheme

The interview will be base on two interview phases. First phase is an "Omnibus" interview in order to estimate the number fraction of recreational fishers that fish without a license. Respondents are selected by telephoning a random non-mobile number. The interview will be conducted with that person within the household with birthday last.

The second phase is based on recreational fishers that have a valid annual license at the time of the interview. Persons holding a license directly contacted as names and social security numbers are available. A detailed questionnaire will be answered either on web or in a telephone interview. This interview should provided detailed information on the fishing carried out and the catches taken (Sparrevohn and Storr-Paulsen, 2010).

III.D.2   Estimation procedure

The total catch of cod and eel in the recreational Danish fishery can be calculated from the information gathered in interview phase 2 (see section III.D.1(a)), extrapolated to the entire population of fishermen (permit holders and illegal fishers) by raising with the estimated effort fished by illegal fishermen found in interview phase 1 (see section III.D.1(a)). The following equation will be used, where (Taq) is the total catch of either cod or eel per quarter (q) and area (a) and C are the catch reported from the interview.

Taq=p/r·{1+(Ei·i)/(Ep)}·(Caq)

p are the numbers of permits issued (estimated 2009 numbers was 34,000 fishing with passive gear and 156,000 anglers, Table 1), r is the numbers that has participated in the permit interviews (1,585 in the passive gear interview and 1,929 in the angling interview). Ei is the average fishing effort of the population that fish illegal, Ep is the average effort of the population that hold a permit and i is the fraction that fish illegal.

III.D.3 Data quality evaluation

Sources of bias:

For the gillnet cod catches one weakness in this type of survey are how to treat vey high reports. At a survey in 2009 a single respondent that reported catches of cod as high as 1000, 0, 1500 and 600 kg for the periods Aug-Oct, May-Juli, Feb- April and Nov-Jan, respectively. If this single respondent is excluded from the results the total catches of cod in gillnet decreases to 135 t compared with a total of 212 t. This specific respondent also reported the highest number (400) cod caught within one quarter for any respondent that fished as an angler.

At the interview survey in 2009 only Danish citizens were targeted indicating that the fraction of fish caught by tourists is unknown. This is a specific problem in the angling fishery for cod where got about claims a quit large catch in some areas, especially by German tourist. The Belt Sea area is expected to be the area where the highest numbers of cod are caught by German tourist. This is due to a combination of a rather high number of Summerhouses for rent during the summer season; the possibility rent smaller fishing-boats and a calm sea. One could expect the same pattern along the Western Coast of Denmark where lots of summerhouses are rented out to tourist during the summer, but the nature of the Sea makes it impossible to sail with smaller boats most of the time. The Sound and The North Sea/Skagerrak areas are probably also witnessing some cod catches from specific fishing tourist that travels to Denmark and fish from chartered boat either during the winter in the Sound area or in the North Sea/Skagerrak area.

III.D.4 Data presentation

The Danish finding on catches taken in recreational fisheries will be available in a yearly report and will be included in data provided to the RFOM's.

III.D.5 Regional coordination

No regional coordination is anticipated.

III.D.6 Derogations and non-conformities

No derogation or non-conformities is anticipated

North Sea and East Arctic

III.D.1 Data acquisition
Fishing ground: IV and VIId

Denmark have limited fishery for cod in the Kattegat and the Skagerrak but do not have recreational fisheries for eel in these areas. No recreational fishery takes place in the North Sea.

More details on cod and eel are given in the section on the Baltic region. See also this section for sampling strategy.

(a) Type of data collection
See the section for the Baltic region

(b) Target and frame population
See the section for the Baltic region

(c) Data source
See the section for the Baltic region

(d) Sampling stratification and allocation scheme
See the section for the Baltic region

III.D.2 Estimation procedure
See the section for the Baltic region.

III.D.3 Data quality evaluation
See the section for the Baltic region.

III.D.4 Data presentation
See the section for the Baltic region.

III.D.5 Regional coordination
No regional coordination is anticipated.

III.D.6 Derogations and non-conformities
No derogation or non-conformities is anticipated

North Atlantic
Denmark does not have any recreational fisheries in this region.

III.E Biological - stock-related variables

The Danish standard sampling scheme
The Danish standard sampling scheme will be carried out on a quarterly or monthly basis by ICES Division, Sub-division or statistical rectangle depending on the requirements. All sampling- and measurement procedures are described in internal manual. The Danish sampling schemes for sampling biological information from the landings can be divided into three sampling systems:

- **Harbour sampling of landings of demersal species for human consumption purposes.**
  Sampling of demersal species is mostly carried out in the harbours. For standard sampling a defined number of kilos of fish are collected from each size grade of the landings. These fish are length measured, weighted and aged.

- **Harbour sampling of landings of pelagic species for human consumption purposes.**
  Sampling of pelagic species is mostly carried out in the harbours. Standard samples are non-size grated samples and for these samples a defined minimum number of fish is collected of the landings. These fish are length measured, weighted and aged.

- **Harbour sampling of landings for reduction purposes.**
  The industrial fishery is divided into four types of fisheries; the sandeel fishery, the sprat fishery, the Norway pout fishery and the blue whiting fishery. These fish are length measured, weighted and aged.

Sampling length, weight and age from discards is carried out by scientific observers onboard commercial fishing vessels.

The ageing is performed according to the standardized method. The aggregated data are stored in the Biological database ("Babelfish") at DTU Aqua.

Sex, maturity and fecundity will be sampled during surveys on all species as the samples of the commercial landings either are in such condition that histological measures are impossible or that the sampling is performed on gutted fish. For those species which is landed whole, sexual maturity data is collected in addition to the standard data. For cod, haddock and saithe sexual maturity is routinely collected.

Baltic Sea

III.E.1 Data acquisition

(a) Selection of stocks to sample
Biological- stock-related variables are required for all stocks listed in Appendix VII of the Commission Decision. Exempted from sampling are those stocks of which the national quota is less than 10% of the Community share of the TAC or less that 200 t during the previous 3 years. However, if the sum of the relevant

quota of MS, whose allocation is less than 10%, is more than 25% of the Community share of the TAC, a co-operative sampling has to be set up. For non-quota species similar criteria exist based on the national share in the Community landings.

Sampling criterion for non TAC species has therefore been based on the 200 t limit. Stocks listed in Appendix VII with landings less 200 t were excluded from biological sampling.

Table III.E.1 lists the stocks corresponding to Appendix VII. The average national catches taken in 2007-2008 and the TAC shares for each stock are listed. All stocks with a TAC share of more than 10% are highlighted and qualify for sampling of stock related variables.

(b) Type of data collection

For all species listed in table III E.2 biological parameters are collected from the landings through the routine sampling programmes in the fish auctions. The marked sampling programmes are complemented with measurements from discard programmes and research vessel surveys. This type of data collection can probably be described as type C: Non-Probability Sample survey, in which data are collected from non randomly selected units of population.

The major source of maturation data for cod (pre-spawning or spawning) and for other species are made at the surveys on these stocks in the region. No fecundity estimates are made by Denmark.

(c) Target and frame population

Historically the Danish the sampling frames for harbour/market sampling were concentrated on major harbous /markets. Futhermore, the sampling has been planned to be carried out troughout the fishing season and ajusted according to the landings. As described in section III.C.1.d, Denmark plan to use the outcome from the workshops (WKACCU, WKPRECISE and WKMERGE.) as a guidance to set the target and sampling frame. The intention is to define the port-sampling frames as area lists of access points (ports and harbours) taking into account practical as well as cost issues.

(d) Sampling stratification and allocation scheme

Overview of the long-term sampling strategy of 'Stock related variables' is given in Table III E.2

Table III E.3 gives an overview of the planned sampling for age, weight, sex ratio, maturity and fecundity in the NP years.

III.E.2. Estimation procedures

All biological measurements are collected routinely during the surveys at sea and market- and discard sampling programmes.

The procedures for estimation of length and weight at age based on samples from the commercial fishery is described in section 'III.C/Biological - métier-related variables/Baltic Sea/III.C.2 Estimation procedures/Estimation of length and age structure of catches' Box 3.

For most stocks, data on sex and maturity at age are collected mainly at surveys and the data are uploaded as raw data to DATRES according to the procedure described in the DATRAS format manual. http://datras.ices.dk

The maturity data has been converted into a command standard defined in the BITS manual (ICES, 2008).

All of biological measurements, made by the individual MS, are only representative for part of the stock and represent only measurements of biological characteristics of individual fish. Stock representative variables can only be calculated when sampling covers the whole stock in a representative way. This is often not the case and stock representative estimates of biological parameters can only be obtained in combination with measurements from other countries. Also additional information from other sources may be required to estimate the stock related variables. In practice the estimation of the biological stock-related variables is carried out by international planning or expert groups.

III.E.3. Data quality evaluation
No a priori analysis has been carried out in order to estimate the number of measurements needed to achieve the required precision for the stock related parameters. Such analyze is stock and parameter specific and will require access to other information which is not available or can be made available by MS to an international expert group. The sampled targets are based on historical guidelines applied in previous NP.

The actual measurements are being screened by data base checking procedures before they are stored in the national computerized database.

The standard tool (COST) for analysing precision will be implemented in the regional data ware house FishFrame. The COST will also be used as a guide for reconsidering sample size as well as sampling setup. DTU Aqua within its organisation established age and sexual maturity programme. Samples of otoliths from time to time are analyses for micro structure in order to check the quality of the age determinations. Sub-samples of sexual maturity determinations are checked using histology.

III.E.4   Regional coordination
Denmark has for several years had cooperation and task sharing with Sweden, Finland and Germany. Furthermore, Denmark has worked actively at the RCM in the Baltic for increased coordination towards shared regional sampling programme.

Bilateral agreements have been made between Denmark and Sweden and Denmark and Germany. These agreements are attached as Appendix 1 to Appendix 3.

Denmark has tried to apply to all recommendations made by the Regional Data Collection Meetings (RCM's) during the years since they were established in 2004. Below is a list of relevant recommendations each request is accompanied by a comment on how Denmark has applied to the request. Few requests have turned out not to be relevant at the time of realization as management decisions have changed the relevance of the recommendation. The introduction of a regional data base/warehouse, the FishFrame, will in many ways solve the problems experienced with ineffective regional coordination by providing basic sampling and analysis results and real time information about sampling status and by that make regional coordination much easier.

The data collected will be stored in a national database and be made available for cooperative analyses with other MS. The results of the data collection will be published in a number of reports aiming at a deadline of 6 months after the start of a new calendar year for the availability to end-users.

For the purpose of providing scientific advice to fisheries management, aggregation of data will be prepared and presented to the relevant working groups.

Stock related variables: Inconsistencies in NP proposal tables		Danish action
RCM Baltic 2010 and 2011 Recommendation	To avoid inconsistencies and errors in the tables filled in by MS in their NP proposals, the following are recommended: Table III.E.1: - Species list in a fixed format (e.g. drop down menu) - Area/Stock definition in a fixed format (e.g. drop down menu) , following the list established by FisfFrame, see recommendation below. - MS should follow the guidelines and put in absolute figures for landings even if landings are below 200 tonnes. - MS should follow the guidelines and put in absolute figures for percentage even if percentage is below 10%. Table III.E.3: - Species list in a fixed format (e.g. drop down menu) - Area/Stock definition in a fixed format (e.g. drop down menu) following the list established by FisfFrame, see recommendation below. - data sources in a fixed list (survey, sea sampling, market sampling etc).	Denmark is using the FishFrame exchange format therefore not a problem for Denmark.

Stock related variables: Inconsistencies in NP proposal tables		Danish action
RCM Baltic 2010 Recommendation	To avoid inconsistencies and errors in the tables filled in by MS in their NP proposals, the list of "stocks" established and used in Fishframe should be used as a standard. The list is presented in annex 6 of this report.	Denmark is using the FishFrame exchange format therefore not a problem for Denmark.

Stock related variables: age reading of eel and use of data in the eel stock assessment		Danish action
RCM Baltic 2010 Recommendation	In order to optimise the strategies for age reading of eel and try to come up with proper task sharing of age reading on a regional scale, the WGEEL need to inform RCM Baltic on how / if age disaggregated data on eel will be used in the assessment.	Denmark is awaiting feedback from ICES on this recommendation.

Stock related variables: task sharing of age reading of species caught in BITS survey and eel		Danish action
RCM Baltic 2010 Recommendation	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.	Denmark has made an agreement with Belgium on turbot and brill. At the RCM Baltic 2011 agreement on other species is made.

Stock related variables: separation and assessment data quality for herring in Division IIIa and Subdivisions 22-24		Danish action
PGCCDBS 2010 Recommendation	PGCCDBS recommends that national laboratories should have a data compilation workshop to consider stock separation and assessment data quality for herring in Division IIIa and Subdivisions 22-24 (ref. WKWATSUP 2010).	Denmark has been doing stock separation of herring for several years.

Stock related variables: Age reading of Baltic cod		Danish action
PGCCDBS Recommendation	PGCCDBS recommends that parallel age reading of young Western Baltic cod should be followed up bilaterally (Denmark – Germany) and reported to WGBFAS and PGCCDBS (ref. WKBFAS 2010) in BITS survey (brill, plaice, turbot, dab, sole). An agreement of task sharing for aging eel should also be established.	Agreement has been made on turbot and brill and for 2012 plaice, dab and sole. A project on Baltic cod will be started in 2012.

Stock related variables: data quality and deficiencies.		Danish action
RCM Baltic 2011 Recommendation	MS to look into discard sampling program according to WKACCU 2008 guidelines (12 aspects).	Denmark has started this work.

Stock related variables: Upload of cod (sd22-24) data to FishFrame		Danish action
RCM Baltic 2010 Recommendation	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	Agreement has been made and plan for the work has been discussed.

Stock related variables: COST responsibility		Danish action
RCM Baltic 2010 Recommendation	In order to be able to develop COST further ownership has to be established and as COST and FishFrame have same exchange format it would seem reasonable for FishFrame to incorporate the COST tool. And for ICES or another organisation to take the ownership	Denmark is having two members in the RDB steering committee.

Stock related variables: task sharing of age reading of species caught in BITS survey, eel, and salmonids.		Danish action
RCM Baltic 2011 Recommendation	RCM Baltic requests WGBIFS to clarify the BITS flatfish species to be sampled (maturity, otoliths, sex, etc.).	The Danish participants in the WGBIFS will make sure this recommendation is taken into account at the 2012 WGBIFS meeting.

Stock related variables: task sharing of age reading of flatfish species caught in BITS survey, eel, and salmon.		Danish action
RCM Baltic 2011 Recommendation	For institutes collecting small volumes of age samples for certain species and when new species are to be sampled, task sharing of age reading is necessary in order to optimise the use of age reading expertise. The RCM Baltic recommends the following MS to investigate their capability to read relevant age samples of interested MS: (1) Germany: plaice (2) Denmark: plaice, dab and sole (3) Poland: flounder and turbot (4) Sweden: eel and salmon (5) Finland: salmon The suggested coordination should be discussed, agreed and decided by the National Correspondents so the first agreements could be established before December 2011.	Denmark has agreed in this recommendation.

Stock related variables: stomach sampling		Danish action
RCM Baltic 2011 Recommendation	Regarding EA and MSFD, RCM Baltic suggests WGBIFS and WGBFAS to address more consideration to stomach sampling	Denmark is awaiting the feedback from WGBIFS and WGBFAS

Stock variables: clarification of the Commission Decision 2010/93/EC		Danish action
RCM Baltic Recommendations	1. In order to avoid that some stocks are not sampled by any MS the exemption rules (III.B2.5.1.(b) in Decision 2010/93/EU should be clarified in the next regulation. 2. The text in Chapter III.B2.5.1 should refer to **landings or quotas** not only **quotas**, to make sure that shares in landings between MS can be calculated to cover the non TAC species.	Denmark is awaiting the feedback from the Commission.

Stock variables: stocks with low landings		Danish action
RCM Baltic Recommendations	The RCM ask for some advice or guidelines on data demands for stocks (included in Appendix VII of the Commission Decision 2010/93/EC), which are landed in small amount.	Denmark is awaiting the feedback from the Commission.

III.E.5 Derogations and non-conformities

Denmark asks derogation not to carry out any genetically analysis on salmon.

North Sea and Eastern Arctic

III.E.1 Data acquisition

(a) Selection of stocks to sample

Biological- stock-related variables are required for all stocks listed in Appendix VII of the Commission Decision. Exempted from sampling are those stocks of which the national quota is less than 10% of the Community share of the TAC or less that 200 t during the previous 3 years. However, if the sum of the relevant quota of MS, whose allocation is less than 10%, is more than 25% of the Community share of the TAC, a co-operative sampling has to be set up. For non-quota species similar criteria exist based on the national share in the Community landings.

Sampling criterion for non TAC species has therefore been based on the 200 t limit. Stocks listed in Appendix VII with landings less 200 t were excluded from biological sampling.

Table III.E.1 lists the stocks corresponding to Appendix VII. The average national catches taken in 2007-2008 and the TAC shares for each stock are listed. All stocks with a TAC share of more than 10% are highlighted and qualify for sampling of stock related variables.

(b) Type of data collection

For all species listed in table III E.2 biological parameters are collected from the landings through the routine sampling programmes in the fish auctions. The marked sampling programmes are complemented with measurements from discard programmes and research vessel surveys. This type of data collection can probably be described as type C: Non-Probability Sample survey, in which data are collected from non randomly selected units of population.

The major source of maturation data for all sampled species will be made at research vessel surveys on these stocks in the region. No fecundity estimates are made by Denmark.

(c) Target and frame population

Historically the Danish the sampling frames for harbour/market sampling were concentrated on major harbous /markets. Futhermore, the sampling has been planned to be carried out troughout the fishing season and ajusted according to the landings. As described in section III.C.1.d, Denmark plan to use the outcome from the workshops (WKACCU, WKPRECISE and WKMERGE.) as a guidance to set the target and sampling frame. The intention is to define the port-sampling frames as area lists of access points (ports and harbours) taking into account practical as well as cost issues.

(d) Sampling stratification and allocation scheme

Overview of the long-term sampling strategy of 'Stock related variables' is given in Table III E.2

Table III E.3 gives an overview of the planned sampling for age, weight, sex ratio, maturity and fecundity in the NP years.

III.E.2.   Estimation procedures

All biological measurements are collected routinely during the surveys at sea and market- and discard sampling programmes.

The procedures for estimation of length and weight at age based on samples from the commercial fishery is described in section 'III.C/Biological - métier-related variables/Baltic Sea/III.C.2 Estimation procedures/Estimation of length and age structure of catches' Box 3.

For most stocks, data on sex and maturity at age are collected mainly at surveys and the data are uplowded as raw data to DATRES according to the procedure described in the DATRES format manual. http://datras.ices.dk

The maturity data has been converted into a command standard defined in the IBTS manual.

All of biological measurements, made by the individual MS, are only representative for part of the stock and represent only measurements of biological characteristics of individual fish. Stock representative variables can only be calculated when sampling covers the whole stock in a representative way. This is often not the case and stock representative estimates of biological parameters can only be obtained in combination with measurements from other countries. Also additional information from other sources may be required to estimate the stock

related variables. In practice the estimation of the biological stock-related variables is carried out by international planning or expert groups.

III.E.3.   Data quality evaluation

No a priori analysis has been carried out in order to estimate the number of measurements needed to achieve the required precision for the stock related parameters. Such analyze is stock and parameter specific and will require access to other information which is not available or can be made available by MS to an international expert group. The sampled targets are based on historical guidelines applied in previous NP.

The actual measurements are being screened by data base checking procedures before they are stored in the national computerized database.

The standard tool (COST) for analysing precision will be implemented in the regional data ware house FishFrame. The COST will also be used as a guide for reconsidering sample size as well as sampling setup. DTU Aqua within its organisation established age and sexual maturity programme. Samples of otoliths from time to time are analyses for micro structure in order to check the quality of the age determinations. Sub-samples of sexual maturity determinations are checked using histology.

III.E.4   Regional coordination

Denmark has for several years had cooperation and task sharing with Sweden, Scotland and Germany. Furthermore, Denmark has worked actively at the RCM in the Baltic for increased coordination towards shared regional sampling programme.

Bilateral agreements have been made between Denmark and the Netherlands, Belgium, Ireland, Scotland and Sweden and Germany. These agreements are attached as Appendix 1 to Appendix 6.

Denmark has tried to apply to all recommendations made by the Regional Data Collection Meetings (RCM's) during the years since they were established in 2004. Below is a list of relevant recommendations each request is accompanied by a comment on how Denmark has applied to the request. Few requests have turned out not to be relevant at the time of realization as management decisions have changed the relevance of the recommendation. The introduction of a regional data base/warehouse, the FishFrame, will in many ways solve the problems experienced with ineffective regional coordination by providing basic sampling and analysis results and real time information about sampling status and by that make regional coordination much easier.

The data collected will be stored in a national database and be made available for cooperative analyses with other MS. The results of the data collection will be published in a number of reports aiming at a deadline of 6 months after the start of a new calendar year for the availability to end-users.

For the purpose of providing scientific advice to fisheries management, aggregation of data will be prepared and presented to the relevant working groups.

Source	Recommendation	Danish action

RCM NS&EA 2011 Recommendations Investigate opportunities for task sharing age	The RCM NS&EA recommends that the task sharing species are investigating by MS participating in current age reading programs and decide whether task sharing is desirable or possible for the future.	Denmark support the task sharing model and will actively work for this solution in 2012
RCM NS&EA 2011 Recommendations Completion of the maturity sampling table	The RCM NS&EA recommends that all assessment and expert groups complete the last two columns of the overview on maturity sampling within Annex X5, and to check all other data columns. This table will be available on SharePoint for update.	Denmark supports this recommendation.
RCM NS & EA 2011 Recommendation Studies on shared international age–length keys	Sampling for *ages* and the construction of ALK should follow sound statistical sampling practices set out according to WKPRECISE. Greater emphasis should be placed on the collection of *age* samples for species subject to age based stock assessments as the collection of length frequency data not linked to age samples may be of limited benefit in improving bias and precision estimates for numbers at age. Databases structures should allow storage of linked age and length samples. Collection regulations should not encourage the collection of length only data at the expense of age sampling for species subject to age based assessments.	The Danish sampling programme follows this recommendation.

III.E.5   Derogations and non-conformities

As Denmark is not conducting any research vessel survey in areas and periods where data on fecundity for mackerel and horse mackerel can be collected, Denmark asks for derogation for collecting the data.

North Atlantic

The Danish landings of fish caught in the North Atlantic region are below the threshold of 10% of the EU quota and will therefore not be sampled for stock specific variables.

III.F Transversal variables

III.F.1 Capacity

III.F.1.1 Data acquisition

All Danish fishing vessels with the right to undertake commercial fishery are registered in the Vessel Register of the Danish Directorate of Fisheries (FD). The Vessels Register is a computerized database and includes among others the following information:

- Vessel type e.g. trawler, seiner
- Vessels age (age of the hull)
- Dimensions of the vessel; GRT, length, width, draught.
- Engine power, type and age.
- Insurance value and –year.

The information in the Vessels Register is registered according to Regulation (EC) N° 2930/1986, N° 2090/1998 and N° 26/2004 and is updated daily.

The information on fishing capacity is merged with other fishery dependent data and stored in the DFAD as described in Section IV.

Data on fishing capacity is aggregated as required in Appendix VIII of the DCF can be delivered at any time.

III.F.1.2 Data quality evaluation

Data on capacity can be given on a precision level of 3 as all fishing vessels is registered. As there is no lower limit on the size of the fishing vessel for registration in the Vessel Register and all vessels are registered. Therefore, a 100% coverage of all Danish fishing vessels will be given.

III.F.2   Effort

III.F.2.1   Data acquisition

The base for the regulation concerning the collection of information on the catch origin is the EC-regulations on logbooks, etc. and the implementation of a control-regulation concerning the common fisheries policy and more explicit regulations of information on catches by Member States.

The set of regulations prescribes that all vessels used for commercial fishery are obliged to keep logbooks of the fishery. The only exception from these rules is vessels with a total length less than 10 meters and for fishing trip in agreement with a catch area declaration. A catch area declaration is made for vessels which limit its fishing activities to a single defined area (ICES Sub-division). It should be mentioned that all fishing vessels in Denmark are registered in databases in FD.

All the information is stored in the Logbook database which is a computerized database of the Danish Directorate of Fisheries and includes among others the following information:

- Vessel name, number and captain
- Departure and arrival date and time
- Gear type employed
- Fishing ground, area and square
- Registration of fishing days
- Estimated catch per species once a day at the minimum.

The information in Logbook database is registered according to the provisions of Commission Regulation (EC) No 2807/83 and No 2847/93.

It is possible to estimate the fishing effort, defined as fishing days, for vessels less than 10 meters as sales slips also for these vessels are recorded. Therefore, if a sales slip is recorded for a vessel less than 10 meters, a fishing day can be recorded.

Effort for fishing vessels not carrying logbooks or vessels less than 10 meters are defined as if a sales note exist and the effort for the vessel concerned are defined as one fishing day.

The information on fishing effort is merged with other fishery dependent data and stored in the DFAD as described in Section VI.A.

The above measures of fishing effort is aggregated as required in Appendix VIII of the DCF can be delivered at any time.

III.F.2.2   Data quality evaluation

Data can be given on an aggregated level by segments as described in Appendix V, Appendix VI and Appendix VIII of the DCF can at any time be delivered on a precision level of 2 respectively level 1 for passive gears.

III.F.2.3   Data presentation

The data to be used by the RFMOs and for Denmark it is solely ICES will be ready for the stock coordinators before the set deadlines. This means that the data can be used to support scientific analysis as the basis for advice to fisheries management. Data to be used by STECF will be ready approximately 4 month later than the end of the sampling year. For other data end-users data the provision laid down in Council Reg. 199/2008 article 18 will be followed.

Data on effort will be available per metier per month and per rectangle.

III.F.2.4   Regional coordination

Denmark welcomes if data end users such as ICES or STECF could define their data needs. This would enable MS to define an international/regional data exchange format of aggregated data.

III.F.2.5   Derogations and non-conformities

'Hours fished': It is not possible to estimate 'Hours fished' since this is not recorded in the Danish logbooks and according to the EU logbook regulation it is not mandatory to record that. Therefore, Denmark request for derogation for recording and submitting "Hours fished".

The variables concerning numbers of gear ('Number of rigs', 'Number of fishing operations', 'Number of nets, length', 'Number of hook, number of lines', 'Number of pots, traps') and 'Soaking time' are not recorded in the Danish logbooks. According to the EU logbook regulation it is not mandatory to record this detailed information. Therefore, Denmark request for derogation for recording and submitting this information

III.F.3   Landings

III.F.3.1   Data acquisition

According to the legislation information on fish and shellfish sold in Danish harbours has to be reported to FD. The registration and information duty applies to the following persons and parties:

- Storage warehouses, cold storage warehouses, or other establishments receiving fish and shellfish with purpose for sale, storage, sorting, or other liking treatments before the fish is sold to first hand buyers.
- Persons or parties that as a part of their trade buy fish directly from the fishermen for sale purposes on the home-market, export including transistation, for conservation purposes or processing for later sale.
- Persons or parties receiving fish directly from the fishermen in cases where the sale has taken place before the landing of the fish.
- Fishermen selling the catch directly to the consumer, lands it directly in a foreign country, export it including transit or process the fish from own landing.

Therefore, all information on sold fish and shellfish are registered and all these information are stored in the Sales Notes database which is a computerized database and includes among others the following information:

- Vessel number.
- Landing place and buyer.
- Species and size-class.
- Quality and purpose (e.g. human consumption).
- Weight in kilo and value in national currency (exchanged to DKK)

The information in the Sales Notes database is registered according to the provisions of Council Regulation (EC) No 2847/93 and No 104/2000. Conversion factors for raising from gutted weight to live weight is given in Table III.F.3.

It should be mentioned that all landings are recorded and there is no derogation for vessels less than 10 meters. This means, a 100% coverage for all landings including all other countries flagged vessels landing in Denmark.

The Danish fishery can be divided into two categories: A fishery with landings only for human consumption purposes and the so-called "Industrial fishery", where all the landings are made for reduction purposes (fish meal and oil).

Collecting data on landings designated human consumption

The above mentioned information in the Sales Notes database provides the background for collecting information of landings statistics made for human consumption landed by Danish fishing vessels.

Information on human consumption landings by Danish fishing vessels landing in Denmark and abroad will be given on a precision level 3. As human consumption species landings include all landings (census data) the precision will be better than required.

Collecting data on landings designated reduction purposes

For landings made for reduction purposes only the target-species is registered. Therefore, the Sales Notes database does not contain reliable information on by-catches taken by industrial fishing fleet. In order to be able to estimate species composition of the industrial landings additional information has to be collected. The method and data used in estimation of landings by species is described in the following.

The objective of the Danish sampling scheme for industrial landings is to collect data needed for estimation of the species composition of landings by statistical rectangle and month.

A number of random sub-samples are taken from the landings. The samples are sorted and weighted by species. The information registered includes e.g.:

- The vessel number.

- Landing harbour and landing date.
- Total landing in kilos.
- Total weight in grams per sample.
- Weight in grams per species.

In addition to the above-mentioned samples, FD collects a number of samples, which are delivered to DTU Aqua. These samples are sorted by species and each species is length measured, weighed and selected species are aged.

The species composition of the landings is derived as follows:

The total landings for reduction purposes by month and area are calculated using the sales note database. The landings are then allocated to statistical rectangle using the relative geographical distribution from the logbook database of landings identified as have been taken for reduction purposes. The output is the total industrial landings by statistical rectangle and month.

The relative species composition by statistical rectangle and month is estimated using the information in the species composition and biological databases. An average composition by rectangle is estimated as the mean of all samples from the rectangle. If more than one sample is taken from the same landing, a mean composition of the landing is calculated and treated as one sample.

After calculation of average composition by rectangle a new average composition is calculated taking into account the species composition in all neighbouring rectangles. Taking the mean species composition of the rectangle and all 8 surrounding rectangles does this.

The total landings by species, statistical rectangle and month are calculated using the estimated species composition and total landings by rectangle and month.

The estimation procedure is illustrated by the flow diagram below.

SALES NOTES DATABASE   LOGBOOK DATABASE

(total catch by ICES division and month)   (relative distribution of landings by

                                                  ICES statistical rectangle and month)

Total landing by ICES statistical rectangle and month

119

SPECIES COMPOSITION DATABASE

(relative species composition by statistical

rectangle and month)
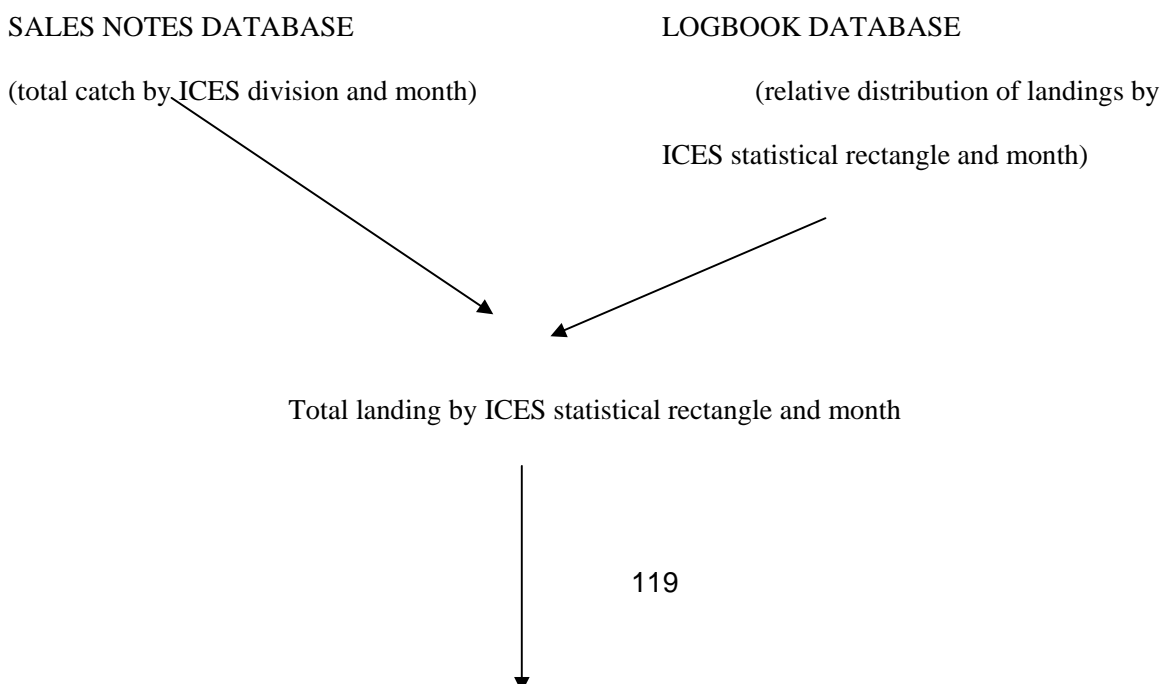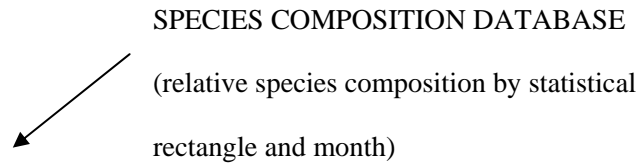
Total landings by species, ICES statistical rectangle and month

The information on landings is merged with other fishery dependent data and stored in the DFAD as described in section VI.A.

III.F.3.2   Data quality evaluation

Data on landings for the stocks mentioned in Appendix VII of the DCF can be given as census data and on a detailed level.

The precision of landings of target (and TAC) species in the fisheries for reduction purposes will at least be at level 2 (Lewy 1996, Lewy 1995).

As some of the species listed in Appendix XII of the DCF occur as by-catch in landings made for reduction purposes in scarce quantities it is not possible to increase the precision without having disproportionately high resource expenses (Lewy 1996, Lewy 1995). Hence it will not be possible when estimating the by-catch quantities per species to reach a precision level higher than 1.

III.F.3.3   Data presentation

The data to be used by the RFMOs and for Denmark it is solely ICES will be ready for the stock coordinators before the set deadlines. This means that the data can be used to support scientific analysis as the basis for advice to fisheries management. Data to be used by STECF will be ready approximately 4 month later than the end of the sampling year. For other data end-users data the provision laid down in Council Reg. 199/2008 article 18 will be followed.

Landings data will be available per metier, per species, per size grade, per rectangle and per month. This level of aggregation is at a more disaggregated level as described in the Council Reg. 199/2008, Com. Reg. 665/2008 and Com. Decision 2010/93/EU.

III.F.3.4   Regional coordination

Landings statistics between flag state and landing country are exchanged through official channels. Other regional coordination is anticipated for collection of data on landings.

Source	Recommendation	Danish action
RCM Baltic 2010 **Recommendation** Common understanding of transversal variables	National correspondents of RCM Baltic countries are requested to complete the "common practice for transversal data collection" table with information on the practice of data collection used in the respective country. MS are invited to check the table, and input information consistent with their National Programs. MS are invited to include further comments (using the insert-comment excel function) referring to specific variables. In case additional data sources are identified but not reported, the same strategy apply. The following legend must be considered: - A: census - B: probability sample survey - C: non probability sample survey - NA: if the data source is not applicable (because ruled out by another data source) - Yes/No: in case of variables that are calculated on the base of studies provided by additional administrative sources.	Denmark has included description in the text of the national programme.
RCM Baltic 2010 **Recommendation** Common understanding of transversal variables	RCM Baltic 2010 recommends having a workshop on transversal variables where economists, biologists and people responsible for transversal data collection can discuss methodological issues related to data collection, estimation and analysis of these variables. RCM Baltic 2010 suggests the following TOR for the workshop: • Discuss the necessity and applicability of the effort variables listed in the Appendix VIII of DCF • Review and harmonize definitions of variables;	Done at the RCM Baltic 2011 but by biologist and a few economists.

	• Review the outcome of the study Lot 2: Development of tools for logbook and VMS data analysis; • Evaluate transversal data collection practice; • Review the practice of MS collecting effort data for vessels < 10 (8) m.	
STECF EWG 11-02 recommendation	EWG 11-02 considers that duplication of Control Regulation No. 404/2011 of 8 April 2011 (CR) data collection commitments and the commitments according to the DCF should be limited to the cases where the data collected under the CR is unlikely to fulfill the data quality requirements of the DCF. 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. The cooperation system should address all issues of relevance for the collection and processing of data to be collected under the CR and the DCF.	Denmark has internally started this work and will report to the RCM's 2012.
RCM NS&EA 2011 recommendation	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 equally according to the two regulations the RCM NS&EA 2011 recommends: Variables **Hours fished** and **soaking time**	Denmark has internally started this work and will report to the RCM's 2012.

	should be added to Control Regulation 404/2011 (CR) and be included in the logbook as mandatory variables. 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)	

III.F.3.5   Derogations and non-conformities

No derogations and non-conformities are anticipated for collection of data on landings as Danish landings statistic is census.

III.G Research surveys at sea

The DTU Aqua command three fisheries research vessels. The R/V DANA is a 2483 GRT stern trawler with a length of 78 meters. The R/V DANA is used when conducting the International Bottom Trawl Survey (IBTS), the Baltic International Trawl Survey (BITS), the Acoustic Survey in the Norwegian Sea (ASH) and the Herring Acoustic Survey (HERSUR). One of the other Danish research vessels R/V HAVFISKEN, a 20 GRT side trawler is used at the BITS survey in the Kattegat and the Western Baltic area and the Nephrops UVTV survey). The smallest of the DTU Aqua research vessels the R/V HAVKATTEN is normally only used in the very coastal areas and is not used within any of the surveys conducted within the framework of this programme.

All member states are obligated to undertake scientific research at sea to evaluate the abundance and distribution of stock independently of the data provided by the commercial fisheries in the case of stocks mentioned in of the DCF. The below described surveys are all listed in the DCF appendix IX.

In 2011-2013 Denmark will as in the two previous years try to organize cooperation with Germany, Ireland, the Netherlands, Sweden and UK on a joined EU participation in the ICES international coordinated survey on the Norwegian Spring Spawning Herring and blue whiting in the Norwegian Sea. It is the intention that the Danish R/V Dana will be used and that the scientific staff onboard the cruise should be a joined staff. Denmark will offer to act as coordinator of the joined EU survey.

Denmark has agreed in participation in the Blue whiting survey west of Ireland and staff from Denmark participates on the two vessels – R/V Tridens and R/V Celtic Explorer. Denmark will also have staff onboard the German R/V Solea when conducting the Acoustic Herring survey in the southern Kattegat, the Belt Sea and the Western Baltic. This cooperation and participation will continue in 2011-2013.

The research/chartered vessel surveys will be conducted as usually in accordance with the internationally agreed guidelines/manuals or if international manual does not exist national survey manuals are used.

The surveys described in this programme are internationally co-ordinated and will remain so when the programme is implemented. The planning and co-ordination of the surveys are done in the ICES working groups connected with the surveys (IBTS Working Group, BITS Working Group, Herring Survey Planning Working Group, and Planning Group on Surveys on Pelagic Fish in the Norwegian Sea).

III.G.1 Planned surveys

An overview of the planned surveys at sea is given in table III.G.1.

Baltic International Trawl Survey (BITS)

Denmark is participation four BITS surveys. The survey is undertaken two surveys in the 1st and 4th quarter, (BITS Q1 and BITS Q4) in the eastern Baltic using the Danish RV DANA (a 2483 GRT stern trawler) two surveys 1st and 4th quarter (BITS Q1 and BITS Q4) in the Kattegat and the western Baltic using the Danish RV HAVFISKEN (a 20 GRT side trawler).

The survey area is shown for:

- BITS Q1 using RV DANA in figure 1.

- BITS Q1 using RV HAVFISKEN in figure 2.

- BITS Q4 using RV DANA in figure 3.

- BITS Q4 using RV HAVFISKEN in figure 4.

The primary purpose of the survey, to estimate abundance indices for recruitment and stock abundance of the Baltic cod stocks, is undertaken by RV DANA. The cod population is estimated by means of establishing catch-rates in bottom-trawls in different depths and areas mainly in the ICES subdivisions 24, 25, and26,. Besides data on maturity, weight of individual cod and liver and gonads are collected to establish sex specific maturity, mean weight and condition at age for cod. Since 2008 maturity data on plaice, flounder and turbot has been conducted on the first quarter survey. Hydrographical data are collected with a CTD.

The second part is undertaken by RV HAVFISKEN and provides in addition to cod also abundance indices for flatfish in ICES subdivision 21-23. The species composition and the length distributions of all caught fish are recorded, and samples for ageing are taken of cod, plaice and sole. Maturity data from plaice, flounder, and dab. Hydrographical data are collected with a CTD.

The sampling procedure and the level of precision are defined in the Manual for the Baltic International Trawl Surveys,

(http://www.ices.dk/reports/LRC/2008/WGBIFS/Addendum%201%20BITS%20Manual.pdf)

Data are stored in a national and an international (ICES) database and used by relevant ICES Working Groups.

Data for calculation of ecosystem indicators are collected.
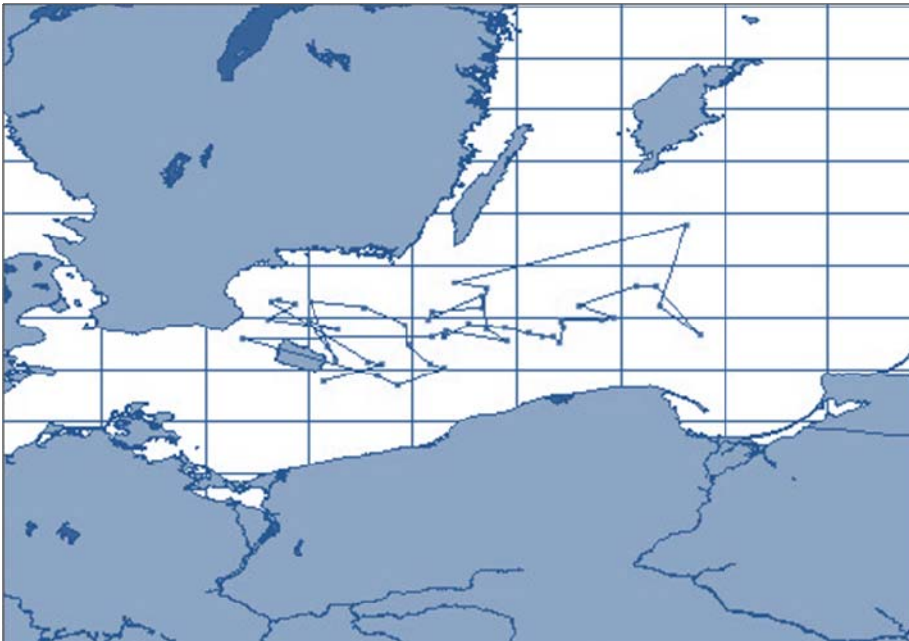
Figure 1. Map showing the RV Dana BITS Q1 2007 survey grid. The survey area will be app. the same for the BITS Q1 in 2012.

Figure 2. Map showing the RV Havfisken BITS Q1 2007 survey grid. The survey area will be app. the same for the BITS Q1 in 2012.
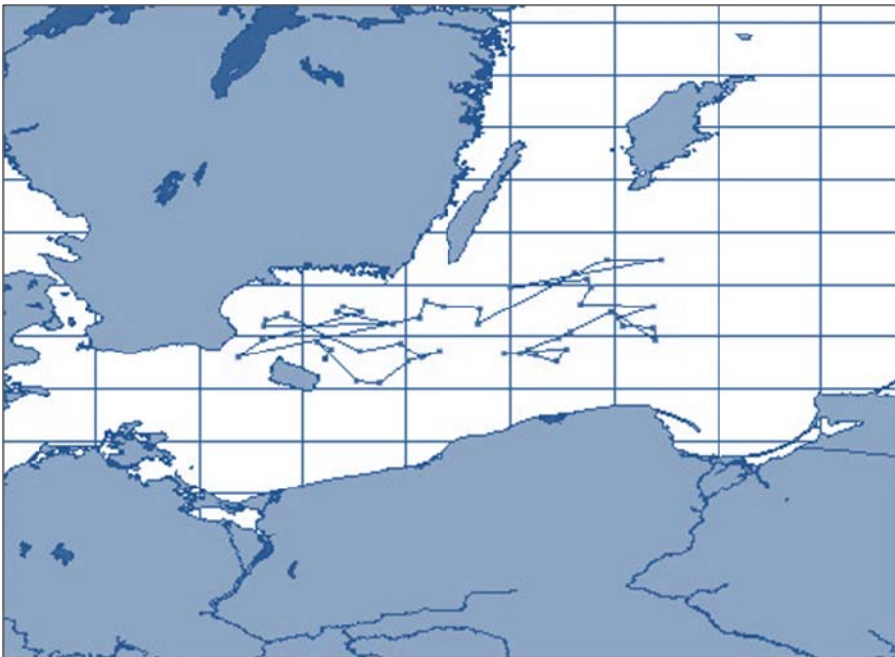
Figure 3. Map showing the RV Dana BITS Q4 2007 survey grid. The survey area will be app. The same for the BITS Q4 in 2012.
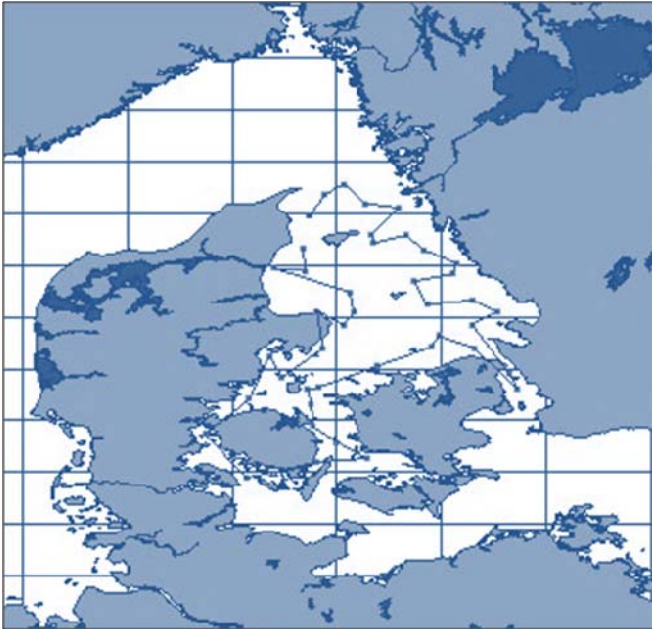
Figure 4. Map showing the RV Havfisken BITS Q4 2007 survey grid. The survey area will be app. 4 the same for the BITS Q4 in 2012.

Baltic International Acoustic Survey (BIAS)

Denmark has agreed in participation at Baltic International Acoustic Survey (BIAS) and staff from will be onboard the German RV Solea when conducting the Acoustic Herring survey in the southern Kattegat, the Belt Sea and the Western Baltic. This cooperation and participation will continue in 2011-2013.

International Bottom Trawl Survey (IBTS)

The main purpose of the IBTS in the North Sea is to estimate abundance of commercial and non-commercial fish species. Otoliths of commercial species (cod, haddock, whiting, Norway pout, saithe, herring, sprat, and mackerel) are collected to assess abundance by age, in particular for the recruiting year classes in the North Sea, the Skagerrak and the Kattegat. Besides, biological information (maturity, individual weight at length) is recorded for a wide list of fish species and some invertebrates. The survey is conducted twice a year, in the 1st and the 3rd quarter.

The survey is ICES coordinated and performed in collaboration with research vessels from France, Norway, England, Germany, The Netherlands, Scotland and Sweden. The survey is carried out as a bottom trawl survey deploying a GOV trawl during daylight hours as a standard aboard all research vessels involved. This is complemented CTD casts on each fishing station and by sampling of herring larvae with a MIK net during the night in the 1st quarter survey.

The sampling procedure and the level of precision are defined in the Manual for the International Bottom Trawl Surveys (Revision VII):

(http://www.ices.dk/datacentre/datras/NSIBTSmanualRevVIIdraft.pdf)

Data are stored in an international database in ICES and revised before usage in the relevant ICES Working Group.

Data for calculation of ecosystem indicators are collected.

The survey areas allocated to Denmark are shown for:

- IBTS Q1 using RV DANA in figure 5.

- IBTS Q4 using RV DANA in figure 6.
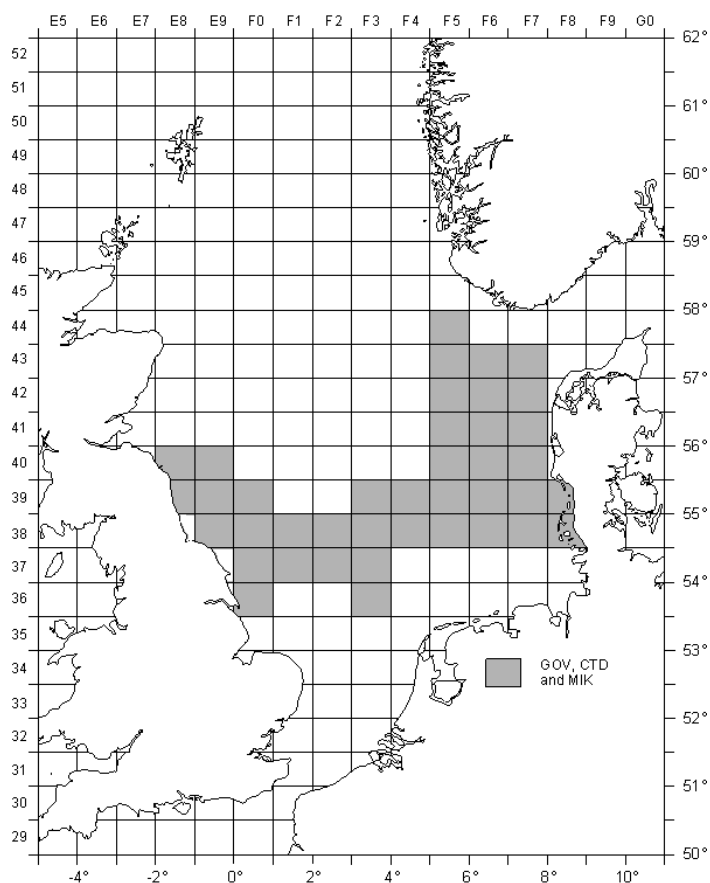
Figure 5. Map showing the RV Dana IBTS Q1 2010 survey grid. The survey area will be app. the same for IBTS Q1 2011-2013 (40 rectangles, 18 days).
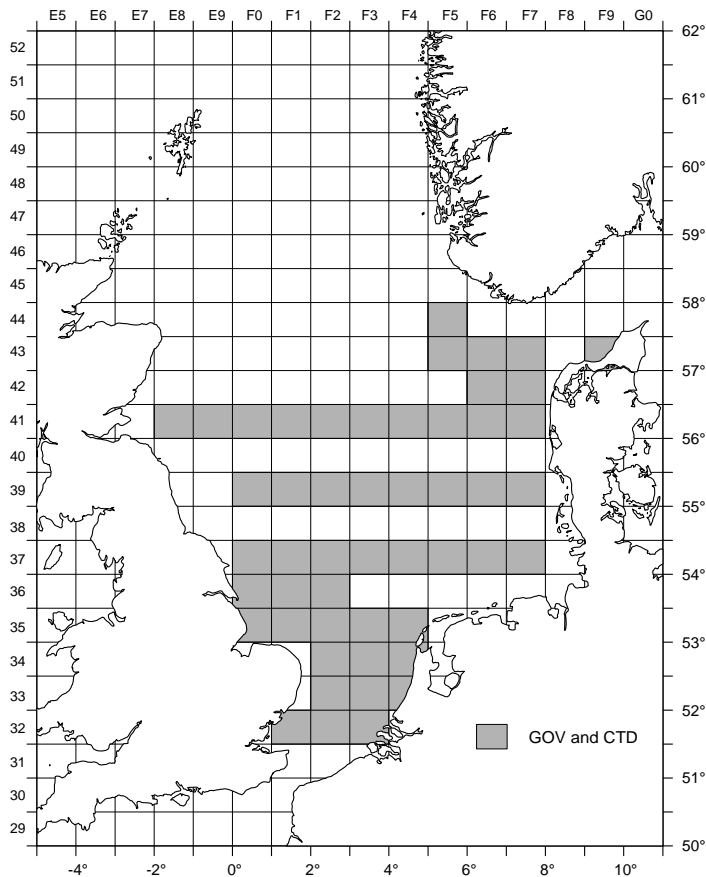
Figure 6. Map showing the RV Dana IBTS Q3 2009 survey grid. The survey area will be app. the same for the IBTS Q3 in 2011-2013 (48-50 rectangles, 18 days).

North Sea sandeel survey (NSSS)

In order to improve the scientific advice on sandeel Denmark started six years ago a survey series for establishing a fishery independent recruitment index. This index should provide information that could support the scientific advice ion sandeel and should be the basis for setting a preliminary index for the sandeel fishery for the coming year.

It is planned that sampling should be carried out at 35 predefined stations. The survey area is shown in figure 7.

Survey location definition used for sampling of sandeels with the modified scallop dredge. Sandeel fishing grounds and Norwegian EEZ indicated on the map. The colours show sampling priority for individual locations (1 is highest and 4 lowest). The survey is conducted with a commercial fishing vessel.
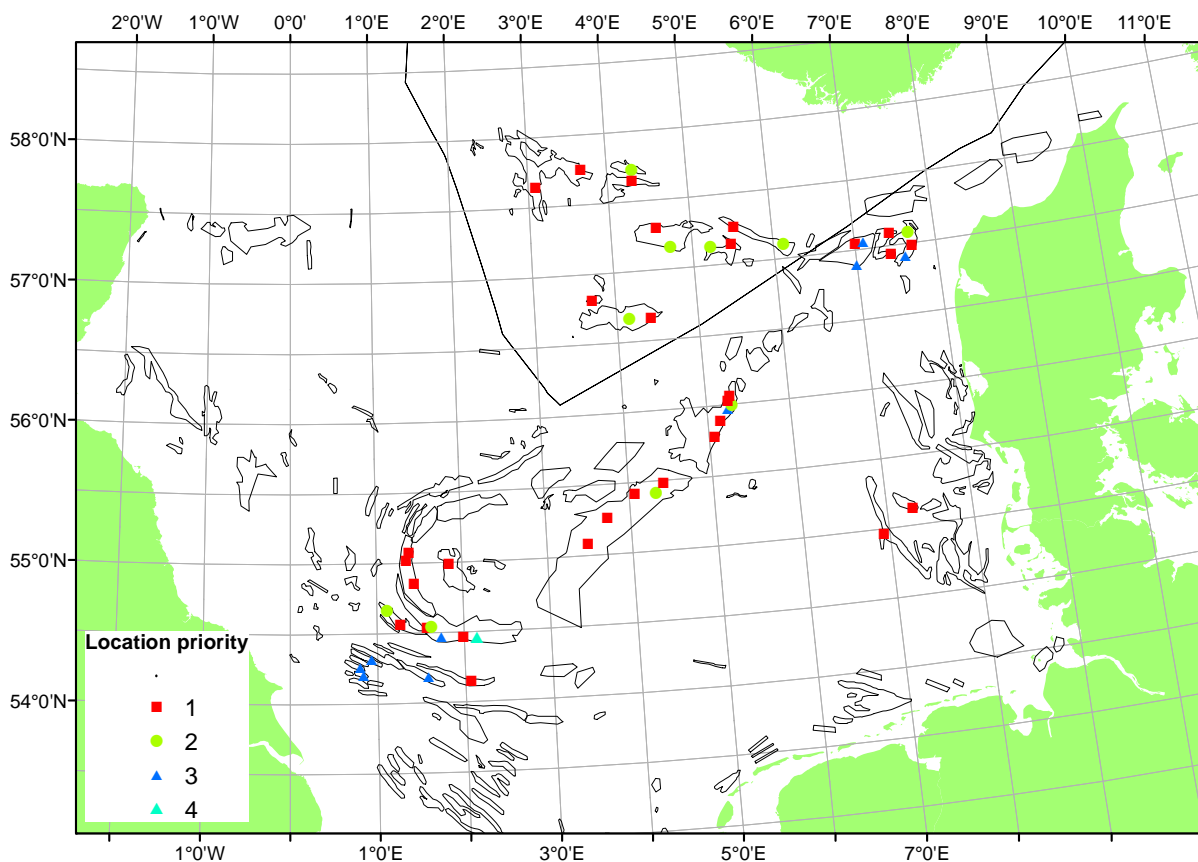
Figure 7. Map showing the sandeel survey area. The survey area will be app. the same for the sandeel survey in 2011-2013.

International Ecosystem Survey in the Nordic Sea (ASH)

The survey is planned to take place in May-June in cooperation with Norway, the Faroe Islands, Iceland and Russia. The total survey time is undertaken on 30 days and consists of a calibration part (1-2 sea days) and an acoustic abundance estimate of herring stocks (28 sea days) inclusive the time used to steam from homeport to the survey area and back to homeport again.

The purpose is to provide acoustic abundance estimates of herring and blue whiting in the Norwegian Sea.

The survey will be conducted as specified by the Herring Survey Planning Working Group, Planning Group on Surveys on Pelagic Fish in the Norwegian Sea (ICES, PGNAPES)

Hydrographical data are collected using a CTD and plankton using a WP2 sampler.

Data are stored in a database and revised before usage in the relevant ICES Working Group.

Denmark has offered to act as co-ordinator of conducting the survey and will contact other member states (Germany, Ireland, the Netherlands, Sweden and UK) which have quota shares of more than 5 % on the EU Norwegian Spring Spawning quota. A proposal for costs sharing for conducting the survey will be distributed to Germany, Ireland, the Netherlands, Sweden and UK. If not **all** involved member states participate in conducting the survey are willing to pay their share of the costs, Denmark will ask for derogation for running the survey.

A description of the survey can be found in 'Report of the planning group on Northeast Atlantic pelagic ecosystem survey (PGNAPES) at

http://www.ices.dk/workinggroups/ViewWorkingGroup.aspx?ID=80

The anticipated survey area is shown in figure 8.
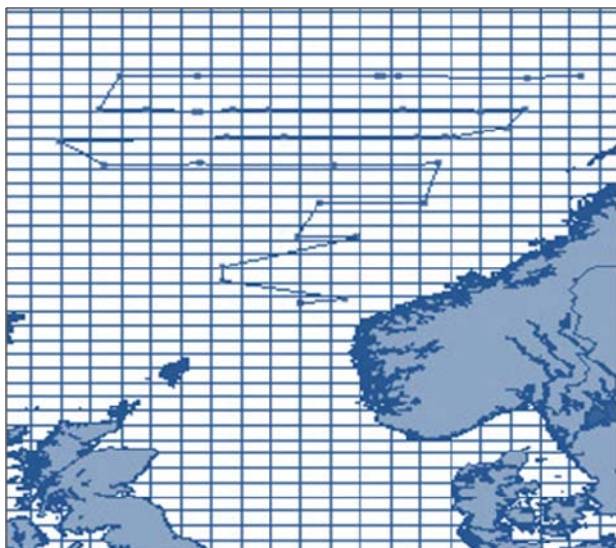
Figure 8 Map showing the RV Dana ASH 2007 survey grid. The survey area will be app. the same for the survey in 2011-2013.

NS Herring Acoustic Survey (NHAS)
The survey is undertaken during the 2nd and 3rd quarter and consists of a calibration part (2 days) and an acoustic abundance estimate of herring stocks (12 days) in the North Sea, the Skagerrak, and the Kattegat.

The purpose is to provide acoustic abundance estimates of herring and sprat in the North Sea (eastern part), the Skagerrak, and the Kattegat. The acoustic abundance estimate is done in collaboration between Denmark, Norway, Scotland, Germany, and The Netherlands. The herring are length measured and weighted aboard and sent to the laboratory in Charlottenlund for further examinations such as sex, maturity, age and spawningtype.

Hydrographical data are collected using a CTD.

Data are stored in a database and revised before usage in the relevant ICES Working Group.

The sampling procedure and the level of precision are defined in the 2008 (Version 3.2) manual.

The survey area is shown in figure 9.
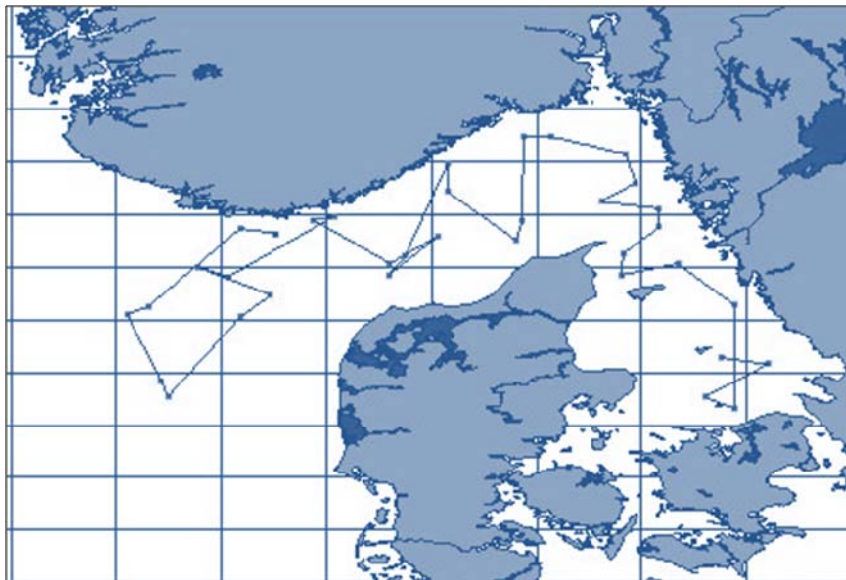
Figure 9. Map showing the RV Dana 2007 NS Herring acoustic survey grid. The survey area will be app. the same for the 2011-2013 survey.

Nephrops UVTV survey (NTV 3&4)

Denmark carries out a Nephrops underwater television survey (UWTV) in Div. IIIa. In recent years DTU-Aqua has been using UWTV surveys to independently estimate the abundance and stock size of Nephrops (*Nephrops norvegicus*) in the Kattegat. An underwater video camera and lights are mounted on an underwater sledge which during the surveys is towed over the seabed for around 10-15 minutes at a speed of 0.5 knots. The video signal is directly transmitted to the research vessel and recorded. Counts of burrows from the records and information of the area covered on each tow is used to estimate the density of Nephrops. Currently, DTU-aqua conducts the survey with RV Havfisken in the 2nd and the 3rd quarter A stock estimate of the entire Nephrops grounds in Div. IIIa is interpolated using various types of statistical methods. In 2010, the Danish surveys will cover on major fishing grounds in the Kattegat and the Skaggerak. (area 1 and area 3 in the figure 10) and currently in total 15 days at sea are planned for this pupose. Supplemental sampling may comprise other areas if time allows and may be conducted in cooperation with Sweden in the future. The current survey design on allocation of stations to certain area is under revision in order to optimise area coverage. A considerable extension of area coverage, however, would require an increase in days at sea even if station-to-station and transect distance for the areas covered can possibly be increased.
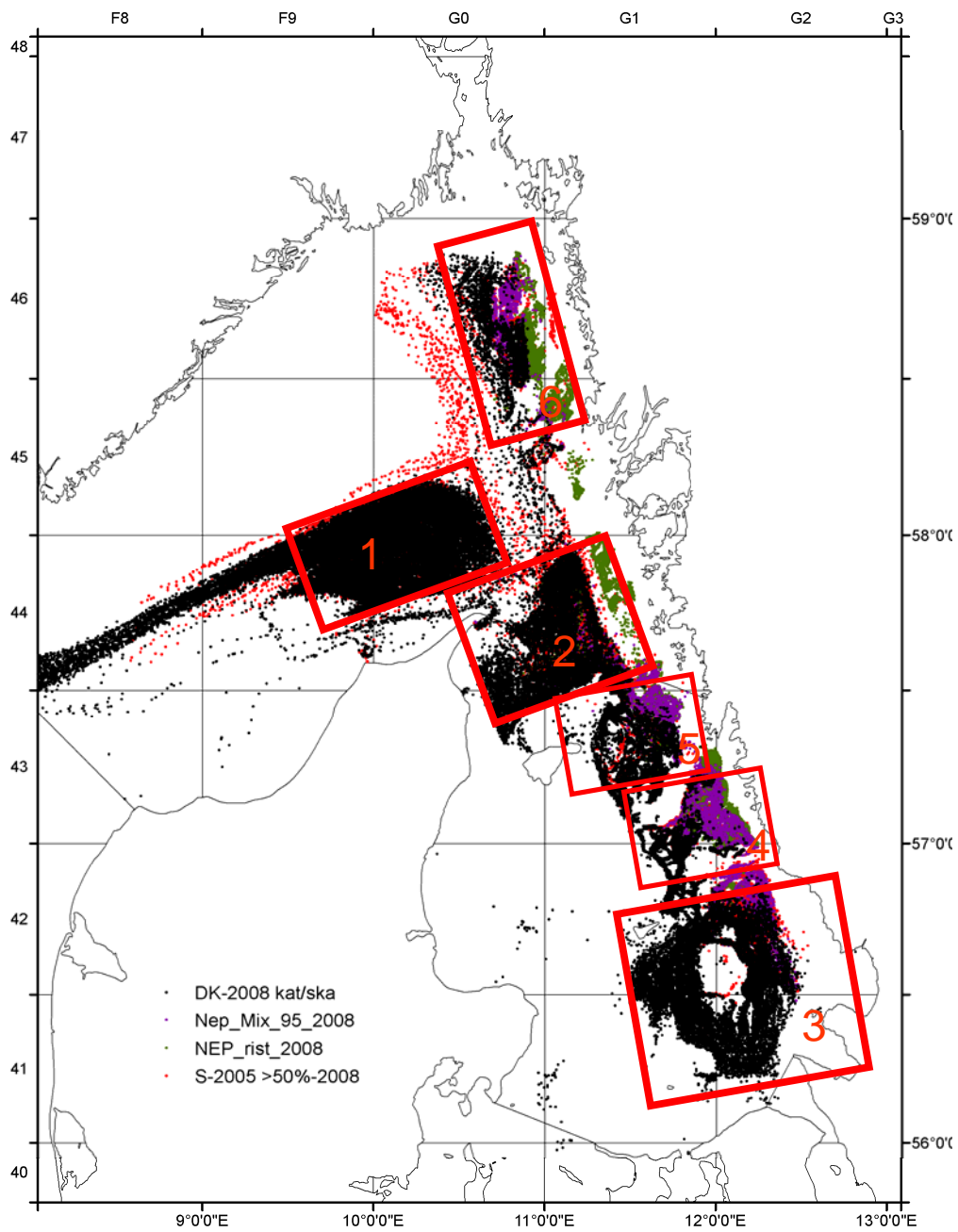
Figure 10. Major fishing grounds for the Danish and Swedish Nephrops fishery in the Kattegat and the Skagerrak.

Blue whiting survey

In 2011-2013 Denmark will participate in the Blue whiting survey west of Ireland and staff from Denmark participates on the two vessels – RV Tridens and RV Celtic Explorer.

The survey is planned to take place in March – April and it is planed that the Dutch RV Tridens and the Irish RV Celtic Explorer will conduct the survey. The survey is conducted in cooperation with Norway and Russia. The total survey time is 18 days for RV Tridens and 20 days for RV Celtic explorer

The purpose is to provide acoustic abundance estimates of blue whiting at the spawning grounds.

The survey will be conducted as specified by the Herring Survey Planning Working Group, Planning Group on Surveys on Pelagic Fish in the Norwegian Sea (ICES, PGNAPES).

III.G.2 Modifications in the surveys

In the Baltic, two types of surveys are conducted following the international manuals defining sampling procedure and sampling size etc. The Baltic International Trawl Survey (BITS) in quarter 1 and quarter 4, follows the manuals BITS 2002 (ICES CM 2002/H), and for Baltic International Acoustic Survey (BIAS) manual version 0,8 BIAS 2008 is used. The surveys are planned within the ICES WGBIFS working group.

At the ICES IBTSWG meeting in 2008 it was agreed that since 2009 maturity data should be collected for a number of species using revised manuals. It is expected that such agreements will be made for future surveys.

III.G.3 Data presentation

BITS and BITS data will be provided to the ICES DATRAS data base and to the ICES assessment group WGBFAS. These data are free available to the public. The data from the International Ecosystem Survey in the Nordic Seas and the blue whiting survey is provided to the ICES PGNAPES and the ICES assessment group WGWIDE. The collected data from the NS Herring Acoustic Survey is provided to the ICES WGIPS and the ICES assessment group HAWG.

The nephorps and sandeel survey data is presented the ICES assessment group NSSKWG.

Therefore, all survey data has in the past will in the future be provided and used for the stock assessment work by the relevant ICES assessment groups.

III.G.4 Regional coordination

The BITS Q1 and Q4 surveys and the BIAS survey are coordinates by the ICES WGBITS and Denmark participates in this group. At present Denmark is having the chairmanship.

The IBTS survey is coordinated by the ICES IBTSWG. Denmark participates in this group.

As Denmark is the only MS that is carrying a sandeel survey no regional coordination is anticipated.

The International Ecosystem Survey in the Nordic Seas and the blue whiting survey are coordinated by the ICES PGNAPES. Denmark participates in this group.

The NS Herring Acoustic Survey is coordinated by the ICES WGIPS. Denmark participates in this group. At present Denmark is having the chairmanship.

No official international coordination of the Nephrops TV survey (FU 3 & 4) takes place. Denmark is though working closely with Sweden.

III.G.2 Derogations and non conformities

Denmark has offered to act as co-ordinator of conducting the International Ecosystem Survey in the Nordic Seas and will contact other member states (Germany, Ireland, the Netherlands, Sweden and UK) which have quota shares of more than 5 % on the EU Norwegian Spring Spawning quota. A proposal for costs sharing for conducting the survey will be distributed to Germany, Ireland, the Netherlands, Sweden and UK. If not **all** involved member states participate in conducting the survey are willing to pay their share of the costs, Denmark will ask for derogation for running the survey.

No other derogations and non-conformities are anticipated for the surveys carried out by Denmark.

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

IV.A Collection of data concerning the aquaculture

IV.A.1 General description of the aquaculture sector

Statistics Denmark (DST) estimates the gross output value from the Danish commercial aquaculture sector in 2008 at 135 million EUR and the total produced volume at 45,300 tonnes. The total population of commercial farms counted in 2008 was 280 owned by 162 companies. The total number of persons employed was 730, of whom 430 were full-time, 140 part-time and 160 seasonally employed according to the Danish Directorate of Fisheries (FD).

The main species produced in Denmark is rainbow trout with a volume of 37,900 tonnes and a gross value of 93.4 million EUR and European eel with a volume of 1,700 tonnes and a gross value of 13.9 million EUR in 2008.

The following results are from the Danish Aquaculture Account Statistics, which presents results on costs and earnings on an annual basis. The Danish Aquaculture Account Statistic has been carried out by the Institute of Food and Resource Economics (FOI) as a pilot study for the years 2004 to 2007 and by Statistics Denmark for 2008 and onwards.

There will be minor differences in the data for volume and value collected by FD and those collected by DST. The main difference is that data collected by DST are account data and the accounts do not always follow the calendar year. For the accounts statistics, accounts finalized within the reference year are used.

Sea based farming

Sea cage farms in Denmark produce only rainbow trout in cages. In 2008 there were 20 farms distributed on 6 companies of which 5 participated directly in the survey and data for the sole remaining company was imputed. The production volume was 8,911 tonnes and the value was 36.4 million EUR. The production in each farm is quite homogeneous even though there are both small and large producers. The difference in volume and value is caused mainly by the production of trout eggs, roe, which estimated at 11.8 million EUR is the most valuable product from the Danish sea farms.

Shellfish farms producing blue mussels on long lines began production activity in 2004 and are still at a low production level. In 2008 there were 10 farms distributed on 10 companies of which 4 participated in the survey. The production volume was 1,481 tonnes and the value was 1.4 million EUR. The production methods in the segment are up until now very homogeneous.

Land based farming

The land based fish farming is dominated by pond farms producing rainbow trout and recirculation systems producing European eel. New farm types producing rainbow trout by the use recirculation technology has been in production since 2006.

Traditional pond farms in Denmark produce almost exclusively rainbow trout. In 2008 there were 208 farms distributed on 120 companies. 96 farms from 36 companies participated in the survey. The production volume was 24,407 tonnes and the value was 62.6 million EUR. Companies producing more than one species of trout, can for most part be clearly allocated to this segment, because their main income comes from production of rainbow trout. Most of the companies have an integrated production from hatchery to portion size fish. There are both small and large producers but otherwise the segment is very homogenous.

Recirculation systems producing rainbow trout in 2008 consisted of 27 farms distributed on 14 companies. 20 farms from 11 companies participated in the survey. The production volume was 8,198 tonnes and the value was 18.4 million EUR. Most of the companies have an integrated production from hatchery to portion size fish. It is expected that this segment will grow in the coming years, because the environmental impact from these recirculation farms is considered less than from the traditional pond farms.

Recirculation system producing European eel in 2008 consisted of 8 farms distributed on 8 companies. 6 farms from 6 companies participated in the survey. The production volume was 1,606 tonnes and the value was 12.9 million EUR. The segment is very homogeneous; all farms are very intensive and re-circulate more than 95% of the water. All companies have the same kind of production from glass eel to the final product.

Other recirculation system farms are producing turbot, pike perch, pollan, perch, barramundi and a few other species in very small scale. In 2008 this segment consisted of 3 farms from 3 companies of which all participated

in the survey. The on-growing technique is very similar in this segment, but the species produced are very different. The segment is not presented separately.

Nurseries and hatcheries are for most part an integrated part of the production process inside each company. Only a few companies have specialised in production of eyed eggs or fingerling. This segment is not presented separately.

IV.A.2 Data acquisition

(a) Definition of variables

- **Subsidies**

According to the National Accounts the subsidies given to companies in the aquaculture sector is very low.

- **Other income (Company account)**

Include other operating income exclusive of turnover, financial- and extraordinary income in company accounts. Contains other secondary working profits, and changes in stock goods.

- **Imputed value of unpaid labour (calculated from Company account)**

The value of unpaid labour cost is calculated using the average wage from an industrial worker calculated by Statistics Denmark multiplied with the number of people registered as unpaid labour (owners) in the Accounts Statistics.

- **Depreciations of capital (Company account)**

Include write offs and write downs based on the company total value of assets.

- **Financial cost, net (Company account)**

Include income and expenses from interest and returns from capital assets.

- **Extraordinary costs, net (Company account)**

Include extraordinary income and expenses.

- **Debt (Company account)**

Include total value of debt from the balance sheet.

- **Volume of livestock (Company account)**

Include total volume of livestock from the financial account.

- **Volume of fish feed (Company account)**

Include total volume of fish feed from the financial account.

- **Volume of sales (Company account)**

Include total volume of sales from the financial account.

(b) Type of data collection

The data for *Turnover* and *Volume of sales* will be collected from the register of the Directorate of Fisheries (FD) and will be of type A (Census).

The data for the other variables listed in Appendix X of Commission Decision 2008/949/EC will be based on data from the Account Statistics collected by Statistics Denmark (DST) which is of type C (Non-probability Sample Survey).

Data from the two sources are combined to comply with the variables listed in Appendix X of Commission Decision 2008/949/EC.

(c) Target and frame population

The Danish aquaculture sector is defined by the Business Register. In the Business Register the aquaculture sector is defined by the European NACE code 03.2. (European NACE rev. 2). There is no deviation from definition given by the DCF.

Data will be segmented into 4 groups according to their main farming technique, determined on the basis of production value, corresponding to Appendix XI of Commission Decision 2008/949/EC.

Part of the population is further segmented according to economic size based on turnover. Only the segment of traditional pond farms is large enough to allow for this segmentation.

(d) Data sources

The Danish programme will be completed by two sources of data. The first being data from the administrative and statistical registers of FD and the second being data from sample statistics compiled at DST. Supplementary data on e.g. feed quota is drawn from Danish environmental registers.

The administrative and statistical registers in FD are the basic source of information about the Danish aquaculture sector. The data relevant to the collection of economic information for aquaculture includes data on all units. The statistical unit in the FD register is the physical farm, not the owner/enterprise. Available data include farm type (farming technology) and data on production in volume and value.

Cost data, financial information and information on factor input like feed consumption and labour input are not registered in the FD's register. These data are collected yearly by DST in uniform accounting forms. DST each year obtains an extract from the FD registers containing information on all farms with production. This extract is used to analyse and segment the population of aquaculture units.

The overall method behind the Aquaculture Account Statistics is the same as the one that DST is using for the Account Statistics for Fishery and the Account Statistics for Agriculture which is the basis for the Danish contribution to the data collection for the Farm Accountancy Data Network (FADN).

All data on the accounting form refers to the physical unit of an aquaculture farm. When an enterprise owns more than one farm, the account for that economic agent is split into separate accounts for each farm or physical unit. For DCR purposes farm account data are aggregated to company level in order to live up to DCR requirements.

Since DST buys farm accounts from the aquaculture units on farm level and DCR require data on enterprise level the number of accounts paid for will be larger than the number of enterprises in the statistical tables delivered for DCR purposes.

Data collected in 2011 refers to activities in 2010 and results such as the Danish Aquaculture Account Statistics and data for DCR will be available before the end of 2011.

(e) Sampling stratification and allocation scheme
The Account Statistics covers the whole population defined by the Business Register NACE 03.2. Data for the Account Statistics is collected from different sources and combined in such a way that a complete set of accounting items can be imputed for each business enterprise; therefore, no probability sampling is planned in the Danish data collection program for the aquaculture sector.

The sampling of account data by DST is a non-probability sample survey which attempts to achieve the best possible coverage rate (for the response year 2008 the sample covered more than 60% of turnover as well as volume of sales).

Participation in the statistics sample is voluntarily and DST is paying the aquaculture enterprises hired accountants for delivery of data in a specific account form. In the pilot phase of the Aquaculture Account Statistics the survey population has counted all aquaculture enterprises who on beforehand have agreed to participate. This method ensures that there are nearly no non-response in contrast to common random sampling, where non-response is a grave problem and often causes bias in the sample. As a supplement to the voluntary data collection publicly available accounts are bought from the Danish Commerce and Companies Agency (DCCA).

IV.A.3 Estimation
The use of register data from FD gives DST knowledge of many variables for the total population and in this sense the sampling strategy is exhaustive. This approach also makes it possible to impute some detailed variables for those units that do not have complete specification on the detailed level. The imputation is based partly on production data (product category, volume and value) from FD registers and partly on economic data (costs and earnings relationships) from the surveyed population at stratum level.

The stratified imputation method (based on regression analysis) is similar to the method used for many years for the account statistics for processing industry of Statistics Denmark.

IV.A.4 Data quality estimation

The data collected for the aquaculture sector give a complete coverage of all enterprises covered by NACE 03.2. In order to ensure an adequate data quality DST is collecting the economic data from the enterprises professional accountants. Furthermore there are several steps taken to achieve the best possible measures for the economic data.

- A full balanced accounting form to ensure, that the data on the individual level is delivered correctly in a uniform format.
- A beforehand obtained consent from the enterprise to allow their accountants to report all necessary data to avoid participation from a biased population of agents.
- Co-operation from professional accountants to achieve the best possible harmonized data.
- For every unit in the population actual production volume, production value and product type are gathered from FD registers thereby avoiding vaporous estimates.

The coherent structure of economic data makes it possible to validate all variables for each individual economic agent both in detail and consistently combined with other variables. The best way to do that is by setting up a balanced account. Therefore DST has constructed a harmonized accounting form for aquaculture, which ensures that the data is broken down to meet the requirements of the Account Statistic for Aquaculture as well as the specifications in DCR.

For every unit in the population actual production volume, production value and product type are gathered from FD registers.

IV.A.5 Data presentation

Data for the aquaculture sector concerning the year 2010 will be available in 2011, data for 2011 will be available in 2012 and data for 2012 will be available in 2013, meaning a time lag of one year with respect to the reference year.

For some segments (e.g. eel farming and shellfish farming) only a small number of companies are expected to be participating in the account data survey. Hence, for discretional reasons only main sums regarding production and account data may be presented for these segments.

IV.A.6 Regional coordination

DST expects to participate in the Regional Coordination Meetings when none foreseen items concerning the collection and use of economic data for the aquaculture sector are on the agenda.

IV.A.7 Derogations and non conformities

It is suggested that the segmentation of the aquaculture sector should be according to the number of persons employed (SBS 16 11 0) in each enterprise. The Danish aquaculture sector only contains very few enterprises

with more than 5 persons employed. Hence, for reasons of discretion the suggested segmentation may not be carried out.

IV.B Collection of data concerning the processing industry

IV.B.1 Data acquisition

(a) Definition of variables
- **Turnover (Company account) (Structural Business Statistics (SBS) 12 11 0)**

Turnover is the revenue from sales. Included are capitalised work performed by the enterprise for own purposes and all charges (transport, packaging, etc.) passed on to the customer. Excluded is reduction in prices, rebates, discounts, and VAT and excise duties. Income classified as other operating income, financial income and extraordinary income in company accounts is also excluded from turnover.

- **Subsidies**

According to the National Accounts the subsidies given to companies in the fish processing industry is very low.

- **Other income (Company account)**

Include other operating income exclusive of turnover, financial- and extraordinary income in company accounts. Contains other secondary working profits, and changes in stock goods.

- **Wages and salaries of staff (Company account) (SBS 13 31 0)**

Labour cost is defined as the total remuneration, in cash or in kind, payable by an employer to an employee (regular and temporary employees as well as home-workers) in return for work done by the latter during the reference period. Personnel costs also include taxes and employees' social security contributions retained by the unit as well as the employer's compulsory and voluntary social contributions. These include employer's social security contributions to schemes for retirement pensions, sickness, maternity, disability, unemployment, occupational accidents and diseases, family allowances as well as other schemes. These costs are included regardless of whether they are statutory, collectively agreed, contractual or voluntary in nature. Payments for agency workers are not included in personnel costs.

- **Imputed value of unpaid labour (calculated from Company account)**

The value of unpaid labour cost is calculated using the average wage from an industrial worker calculated by Statistics Denmark multiplied with the number of people registered as unpaid labour (owners) in the Accounts Statistics.

- **Energy costs (Company account) (SBS 20 11 0)**

Energy costs include purchases of all energy products during the reference period for electricity, heating and production. Fuel for vehicles is not included.

- **Purchase of fish and other raw material (Company account) (SBS 13 11 0)**

Include purchase of fish and other raw material for production. Packaging purchased as raw material and resale commodities purchased as raw material for resale without transformation.

- **Other running costs (Company account) (SBS 13 11 0/13 12 0)**

Include payments for agency workers, subcontracts, rents, minor inventories, and leasing, ordinary losses on debtors, other and secondary expenses.

- **Depreciations of capital (Company account)**

Includes write offs and write downs based on the company total value of assets.

- **Financial cost, net (Company account)**

Includes income and expenses from interest and returns from capital assets.

- **Extraordinary costs, net (Company account)**

Include extraordinary income and expenses.

- **Total value of assets (Company account) (SBS 43 30 0)**

Total value of assets includes the accumulated value of all investments in the enterprise at the end of the year. The Perpetual Inventory method is used. "The Perpetual Inventory Method" (PIM) generates an estimate of the capital stock by accumulating past purchases of assets over their estimated service lives. The standard, or traditional, procedure is to use the PIM to estimate the gross capital stock, to apply a depreciation function to calculate consumption of fixed capital and to obtain the net capital stock by subtracting accumulated capital consumption from the gross capital stock."

- **Net investments (Company account) (SBS 15 11 0)**

Net investment includes all tangible goods during the reference period. Included are new and existing tangible capital goods, whether bought from third parties or produced for own use (i.e. capitalised production of tangible capital goods), having a useful life of more than one year including non-produced tangible goods such as land. The threshold for the useful life of a good that can be capitalised may be increased according to company accounting practices where these practices require, a greater expected useful life than the one-year threshold indicated above.

All investments are valued prior to (i.e. gross of) value adjustments, and before the deduction of income from disposals. Purchased goods are valued at purchase price, i.e. transport and installation charges, fees, taxes and other costs of ownership transfer are included. Own produced tangible goods are valued at production cost. Goods acquired through restructuring (such as mergers, take-overs, break-ups, split-off) are excluded. Purchases of small tools which are not capitalised are included under current expenditure.

Also included are all additions, alterations, improvements and renovations which prolong the service life or increase the productive capacity of capital goods.

Current maintenance costs are excluded as is the value and current expenditure on capital goods used under rental and lease contracts. Investments in intangible and financial assets are excluded.

- **Debt (Company account)**

Include total value of debt from the balance sheet.

- **Number of persons employed (Company account) (SBS 16 11 0)**

Number of persons employed in the reference period.

- **FTE National (Company account) (SBS 16 14 0)**

Number of persons employees converted into full-time equivalents (FTE) using the definition of the SBS 16 14 0. This is in according with the study FISH/2005/14 page 7.

- **Number of enterprises (Company account) (SBS 11 11 0)**

The number of enterprises is according to SBS 11 11 0.

Data availability:

The data is collected and processed by Statistics Denmark. The final segmentation and validation of data concerning the processing industry is done in cooperation between FOI and Statistics Denmark.

Data for the processing industry concerning the year 2009 will be available in September 2011. Data for 2010 will be available in September 2012, and data for 2011 will be available in September 2013.

(b) Type of data collection

The type of data collection is **A. Census.**

The Danish data collection is based on data from the Account Statistics collected by Statistics Denmark. In collaboration with Statistics Denmark data from the Industrial Commodity- and Account Statistics are combined to comply with the variables listed in Appendix XII of Commission Decision 2008/949/EC.

(c) Target and frame population

The Danish fish processing industry is defined by the Business Register. In the Business Register the fish processing industry is defined by the European NACE code 10.20. (European NACE rev. 2).

There is no deviation from definition given by the DCF.

Data will be segmented into 4 groups using the number of employed calculated as Full-time equivalents according to Appendix XII of Commission Decision 2008/949/EC.

(d) Data sources

The Danish data collection covering the processing industry is based on data from the Account Statistics and the Industrial Commodity Statistics collected by Statistics Denmark. In collaboration with Statistics Denmark data from the Industrial Commodity- and Account Statistics are combined to make sure that all enterprises processing fish are covered by this data collection and to comply with the data variables listed in Appendix XII of Commission Decision 2008/949/EC.

Contents of the Account Statistics

The statistics are essentially aggregations of items of the annual accounts of business enterprises, notably items of the profit and loss account, the balance sheet and the statement of fixed assets. Thus, a wide range of subjects are covered, e.g. turnover, purchases, expenses, profits, assets, liabilities and investment.

The accounts statistics are a reliable indicator of the activity level and of the structure of the Danish business sector. The highest data quality is achieved at the enterprise level, primarily because the enterprises prepare their annual accounts at that level. But also at the establishment level the published results for major activity groups and for counties are highly reliable.

Source: The Statistics are based on questionnaires, The Central Customs and Tax Administration (SLS-E data), the business register. The population is defined on the basis of Statistics Denmark's Central Business Register covering all businesses in Denmark (ESR).

Complete set of accounts: The data collected from all sources are combined in such a way that a complete set of accounting items is computed for each business enterprise.

A. Direct surveying. The most thorough coverage is extended to the firms that are selected for direct surveying. They are given the choice of either filling in a lengthy questionnaire or submitting their annual accounts plus detailed specifications. The questionnaire is modelled on the list of items set out in the Danish annual accounts legislation, so as to facilitate responding. The data obtained by direct surveying are keyed into a data entry system which comprises error detection and verification procedures. Thus, the data are checked for accounting inconsistencies, and warning messages are written out if significant deviations are found when comparing with last year's data or with figures for firms in the same stratum (form of ownership / activity / size group). Frequently the respondents are contacted for clarification. The resulting data for the direct-surveyed firms are regarded as highly reliable. In terms of turnover these firms accounted for 70 per cent of the total for 2007.

B. The accounts data from the Danish tax authorities (SKAT) does not comprise so many items as Statistics Denmark's questionnaire, but the quality of the data is regarded as high, because they are used for individual tax assessment. By stratified imputation the data aggregates from SKAT are distributed among the more detailed items, and in the opinion of Statistics Denmark the resulting item values are reasonably reliable. The firms contributed from SKAT accounted for 17 per cent of total turnover in the 2007 survey.

C. The enterprises that are not covered by the sources A and B are mainly small enterprises, so the available information is limited. For these enterprises stratified imputation based on employment size groups is used to fill out the missing information.

Contents of the Industrial Commodity Statistics

The industrial commodity statistics describe manufacturers' sales of commodities measured in volume and value. In addition to this the statistics comprise a survey of the commodity sales distributed by industries.

The Statistics are based on questionnaires. The population is defined on the basis of Statistics Denmark's Central Business Register covering all businesses in Denmark (ESR).

Survey population:

The reporting unit is the Kind of Activity Unit which is the sum of an enterprise's workplaces engaged in the same economic activity (industry). The statistics cover all Kind of Activity Units within manufacturing, mining

and quarrying with at least 10 employees. The population is selected on the basis of the registered number of employees two years before the survey year.

Coverage:

The surveyed population covers roughly 93 percent of the total turnover in all manufacturing enterprises. The published statistics are not enumerated to the total population of all manufacturing enterprises.

Value data. The total turnover is divided into different kinds of sales:

- Sales of own commodities, i.e. commodities which are manufactured, processed or assembled by the enterprise itself.

- Construction work done for other enterprises, where the other enterprises own the machinery etc. that relate to the work involved in mounting.

- Reconditioning and mending for other enterprises, where the other enterprises own the machinery.

- Paid work (contract work) performed for other enterprises, where the other enterprises own the raw materials etc.

- Commercial turnover or resale turnover.

- Other turnover including income from licences, commissions, know how etc.

The value is calculated as invoice sales ex factory or free delivery inside Denmark. Turnover taxes and production taxes are excluded from the sales value. Invoiced discounts are deducted. General packaging, freight charges and insurance costs are included if they can be distributed to individual commodities.

Information on quantities is declared as net weight, including the packaging normally used when the commodity is sold in the retail trade. Transport packaging is not included.

Industrial groupings:

The statistics use the Danish Industrial Classification Dansk Branchekode 2007 (DB07), which is based on NACE rev. 2. Before 2009, it was published according to Dansk Branchekode 2003 (DB03), but data for the period 2000-2008 have been re-coded to allow DB07 series to start from 2000.

Commodity nomenclature:

The commodities are grouped in a 10-digit nomenclature based on the 8-digit Combinated Nomenclature (CN). The first 8 digits in the commodity nomenclature is always identical with the CN. From 2008 the Nomenclature is completely identical with the CN, only still consisting of 10 digits of which the two last digits are "00".

All data is collected and combined by Statistics Denmark, which ensure the consistency of data.

(e) Sampling stratification and allocation scheme

The Account Statistics covers the whole population defined by the Business Register NACE 10.20. Data for the Account Statistics is collected from different sources and combined in such a way that a complete set of accounting items is computed for each business enterprise; therefore, no sampling is planned in the Danish data collection program for the processing industry.

IV.B.2 Estimation

As the data collection is type A (census) there is no estimation procedures. The data collected covers the whole population.

IV.B.3 Data quality evaluation

The data collected for the processing industry give a complete coverage of all enterprises covered by NACE 10.20. The accounts statistics are a reliable indicator of the activity level and of the structure of the Danish business sector. The highest data quality is achieved at the enterprise level, primarily because the enterprises prepare their annual accounts at that level.

IV.B.4 Data presentation

Data for the processing industry concerning the year 2009 will be available in September 2011 (1½ years time lag). Data for 2010 will be available in September 2012, and data for 2011 will be available in September 2013.

There may be problems concerning confidentiality in the segments containing firms with more than 250 FTE's. There are very few Danish fish processing enterprises with more than 250 FTE's and the segment will, for that reason, probably be clustered with the segment with 50 to 250 FTE's following the rules of confidentiality of Statistics Denmark.

IV.B.5 Regional coordination

FOI or DST expects to participate in the Regional Coordination Meetings when items concerning the collection and use of economic data for the fish processing industry are on the agenda.

IV.B.6 Derogations and non-conformities

It is suggested that the segmentation of the fish processing industry should be according to the number of persons employed (SBS 16 11 0) in each enterprise (SGECA 08 01 Lisbon). Using the number of persons employed is not the common methodology used by the statistical offices in Europe, including Eurostat. It is, therefore; suggested that the segmentation should instead be according to the number of FTE employed in the enterprise (SBS 16 14 0). The Danish segmentation is based on the segmentation in Statistics Denmark, which is based on the number of FTE employed in the enterprise.

The calculation of imputed value of labour is only relevant for small scale enterprises where the owner and his family are the main source of labour input, like in fisheries and agriculture production. The fish processing industry is not a small scale business in Denmark where the main labour input is based on the owner and his family. The value of imputed labour in Denmark is therefore insignificant. It is suggested that this parameter "Imputed value of unpaid labour" is left out of the data collection for the processing industry.

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

Data requirements for the calculation of the ecosystem indicators are specified in Appendix XIII of Commission Decision (2010/93/EC).

To calculate indicators 1, 2 and 3 listed in Appendix XIII of the Commission Decision require data on species abundance and length distribution by species from fishery independent research surveys. Such information is collected routinely in established trawl surveys such as IBTS (North Sea and East Arctic region) and BITS (Baltic Sea Region). The Danish information is available for part of the marine region where the Danish vessel has surveyed on a haul by haul basis.

Indicator 4 requires extended information on age, length, sex and maturity from fishery independent research surveys. During the ICES/PGCCDBS, the ICES/IBTSWG and the ICES/WGBIFS is has been discussed how to coordinate and to standardize this data collection. Denmark has from 2009 onwards collected this information for the target species in the surveys mentioned above.

VMS data has to be used for indicators 4-7 require. VMS data has been made available for DTU Aqua for research purpose under certain conditions such as safeguarding the confidentiality of the identity of individual the vessels. The data are available is on a resolution of one record every 1 hour. As described below in section VI A Management of the data, logbooks and selling slips data are available. Therefore, it is possible to link VMS, Logbook and sales slips data.

Indicator 8 can be calculated by using the at sea observer data.

Indicator 9. The economic data collection carried out by DST includes data on fuel consumption. It is therefore possible to estimate fuel costs per quarter and métier for some segments.

VI. Module for management and use of the data

VI.A Management and the use of the data
Primary data collected under the Danish programme will be stored in the following computerised databases:

➢ Vessel register. Data on fishing capacity. (FD)

➢ Logbook database. Data on origin of catches and on effort. (FD)

➢ Sales notes database. Data on quantities landed and prices. (FD)

➢ Species composition database. Data on species composition in landings for industrial purposes. (FD)

➢ Biological database. Data on discards and biological parameters. (DTU Aqua)

➢ Economic data. (DST)

In order, for the three involved institutes, to use the same primary data on capacity, effort, and geographical distribution of the origin of the landings a common database will be produced every year, the Danish Fisheries Analyses Database (DFAD). This database is a database where data from the register on Danish fishing vessels, data from the Danish logbooks and the catch area declarations database together with data from the Danish sales notes database are merged. It is therefore possible to categorise each landing in one fleet segment, in one fishery etc. This database contains most of the information requested in research projects and in relation to fisheries management. The DFAD is quarterly and yearly updated. The design and development of the database is made in a co-operation between the three above mentioned institutes.

Biological data will be collected by DTU Aqua and stored in a database ("Babelfisk") managed by the institute. These primary data are surrounded by confidentiality and will not be passed on to other persons or authorities without permission.

Economic data will be collected by DST and stored in a database managed by the institute. These primary data are surrounded by strict confidentiality and will not in any circumstance be passed on to other persons or authorities. Each year DST produces an analytic file on the individual level, which includes relevant data for stratification and grouping for statistical purposes. Based on the analytic file a number of statistical files will be produced and made available for external users.

All primary data collected under the programme are dealt with in confidence. Accesses to the data are limited to authorised staff members from the three institutes and no one outside the institutes has access to the data without permission.

International database development and data management

"FishFrame"

The "FishFrame" is a web based database and warehouse application that can be accessed on www.FishFrame.org.

The main objectives of "FishFrame" are:

> To provide consistent centrally calculated biological data input across countries to assessment models (CANUM, WECA etc.) on dynamic aggregation level.

> To establish a logbook which describes the historical details of the raising procedure?

> To facilitate easy access to basic analysis of biological information on dynamic aggregation level.

> To provide the data background for additional analysis on un-aggregated data.

> To provide an easy overview of the sampling status on national and international level.

> To be the data portal for end users

"FishFrame" contains all fisheries assessment relevant data except data for establishing commercial tunings fleets. The assessment relevant data include:

- ➢ Biological information of the landings obtained by sampling from market.

- ➢ Biological information of the catch (discard as well as retained part compiled separately) obtained by observers participating in regular fishery.

- ➢ Biological information of the catch (discard as well as retained part compiled separately) collected by the fishermen themselves.

- ➢ Official landings statistics by two different aggregation levels.

- ➢ Effort statistics by two different aggregation levels.

- ➢ Scientific survey data on exchange format.

The "FishFrame" data warehouse is under continuous development and the number of available predefined dynamic reports and analysis are growing as a consequence of the increasing demands for functionality from various Assessment Working Groups Study Groups and STECF expert groups. Furthermore, the general request from managers for high quality and more transparency in data makes "FishFrame" a central tool in the process. The "FishFrame" has the potential to be a very important tool for the regional coordination of sampling schemes and have already proved its value in the Baltic area as a very useful and convenient tool for analyzing of data. Both the Baltic and the North Sea & Eastern Arctic Regional Coordinating Meeting (RCM) have expressed their support to the "FishFrame".

In 2009 DTU Aqua released a new version FishFrame v. 5 based.

The FishFrame v.5 is able to hold the following DCF required data:

- • "Biological metier related variables" data,

- • "Biological recreational fisheries" data,

- • "Biological stock-related variable" data,

- • "Transversal variables" Landings and Effort data and

- • BITS and IBTS survey data.

This summarizes to all the relevant for the scientific advisory process in ICES and relevant STECF expert groups. The FishFrame v. 5 is expected to be the data portal for all end users.

Denmark will provide sets of data to support scientific analysis needed to advice fisheries management. It includes parameters for assessment purposes or other scientific analysis such as number-at-age, weight-at-age and maturity-at-age which have routinely been submitted to relevant ICES governed assessment groups and to relevant STECF expert groups.

Furthermore, Denmark will provide data to other end user if requested.

VII. Follow-up of STECF recommendations

The evaluations made by SGRN/STECF on the Danish proposals and Technical reports for 2002 to 2011 have been rather favourable and the requests from the Commission for clarifications and explanations have in all cases been delivered in time and accepted.

Other STECF recommendations is listed below and Danish actions or comments to each recommendation is given.

Page/section	Recommendation	Danish action
STECF recommendations from STECF 11-04	STECF recommends that the follow-up of end-user feedback needs to be improved. This could be achieved by setting up a more formal institutional system to manage the dialogue between end-users, National Programmes and DG MARE. STECF suggests that as a first step, a common database that facilitates the transmission of recommendations on data issues should be established by the Commission with input from the RCM.	
Annex 7 SGECA/SGRN 09-01 6.15.ON INTERNATIONAL CO-ORDINATION	Reviewers of the NP neither found that while MS listed their bi-lateral agreements in the annexes, they did not refer to them in the report text (Section III B). **SGRN recommends** MS to address this in future NP submissions.	Denmark has taken this comment into account.
SGECA/SGRN 09-04 6/3. STECF COMMENTS AND CONCLUSIONS, several places	STECF notes that in principle there should be no discrepancies in data and stresses the need for appropriate quality checks on all fisheries data used in support of fisheries management advice. Such discrepancies not only impact on the quality of assessments and advice but also affect the distribution of sampling effort declared and carried out under the DCF. To this end STECF proposes: 1. to include the following request in Terms of Reference for all of its Working Group meetings: "Examine all data for consistency and quality. Any discrepancies should be brought to the attention of the relevant responsible	When providing data to data calls, STECF and ICES there is in Denmark a close cooperation between the national authorities and DTU Aqua, DST and FOI.

	authority, Member State and the Commission." 2. that the issue of data consistency and quality is addressed under the DCF. To do so, STECF recommends that at the forthcoming SGRN WG meetings, a template and procedure for reporting data deficiencies by data user groups should be developed.	
SGRN 10-01	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 (previous SGRN recommendations should be inserted)	Annual sampling is made for most species at the BITS surveys.
	SGRN recommends that RCM insists that all MS to deliver the landings by individual species.	Done by Denmark
70/5.6.5 Exclusion of groups of vessels from the effort management system under the provisions of Article 11.2 of the 'Long-term plan for cod stocks' Regulation (EC) No 1342/2008: Resubmission to the European Commission by the German Authorities.	**STECF recommends** that the German authorities provide additional information on the observer trips carried out: In addition to the observer catch data provided, information on details of individual vessel characteristics, timings and locations of each sampling should also be supplied. Spatial and temporal coverage, and the precision of the estimation of the cod proportions in the catches should be given for onboard observer schemes for the considered group(s) of vessels. In order to assess the extent of spatial decoupling of the fishery and the cod stock, longer term spatial information is required on the percentage of cod catches, the period ideally including the time when the cod stock was above Bpa. The submission from the German authorities makes general comments about the nature of the controls and sampling that the group of vessels are subjected to. Emphasis is placed on the DCF as a means of providing	Not relevant to Denmark.

	observer coverage. STECF, however, recommends that a more detailed outline of these procedures should be provided in particular focussing on plans for observer sampling of catch by this group of vessels so as to ascertain whether catches of cod continue to be below or equal to 1.5% of total catch.	
PLEN-09-03 94/ 5.2. General issues - Experimental fisheries improving the knowledge on components of the herring stock in ICES sub-divisions VIa(S) & VIIb, c	STECF considered that sampling levels should to be at least in accordance with DCF precision targets that require a CV of 20% (level 1) (COM Decision 2008/949/EC). STECF notes that as the level of 'true' cod catches approaches 1.5%, the level of sampling required demonstrating that catches are below 1.5%, increases exponentially (Figure 1). **STECF recommends** that statistical analysis of observer data be undertaken to determine the level of sampling required in order to demonstrate that cod catches are under 1.5% with a CV of 20%. STECF notes that the level of sampling required is likely to be well in excess of current sampling levels under the DCF, particularly with fisheries where the cod catches exceed 0.5%.	Not relevant to Denmark.
SGECA/SGGRN 09-02 17/ 3 ON PRECISION LEVELS	"**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."	Denmark has been using COST but there are still challenges in using COST depending on various raising procedures.

SGECA/SGRN 09-04 61/ Section 2 Regional Co-ordination	In order to harmonise sampling of eels between freshwater and marine waters, SGRN recommends waiting for outcome of EU Study expected in 2011. The RCMs 2010 should provide an overview on all sampling activities on eel, based on the model developed at the RCM NS&EA 2009.	Denmark is awaiting feedback from the eel experts.
71/Section 5 Review of Surveys	In discussions on the review of surveys, it was noted that issues raised in some survey planning groups are sometimes missed by the RCM. SGRN recommends the RCM to consider survey planning issues raised in data end user reports.	Taken into account by Denmark.
103/ Section 10 Main SGRN Recommendations	SGRN considers that running the LM in parallel to the main SGRN meeting is not a satisfactory and that such a practice should not happen again. **SGRN recommends** the continuation of the SGECA Working Group as an STECF sub-group, meeting at least annually, and that further work be undertaken to formalise the role of economists within the RCM in order to maximise their contribution to the DCF. **SGRN recommends** waiting for outcome of EU Study expected in 2011. The RCMs 2010 should provide an overview on all sampling activities on eel, based on the model developed at the RCM NS&EA 2009. SGRN proposed some items to be included in the terms of reference for the RCM in 2010. In particular, the RCM's should compile information provided by MS according to templates agreed by SGRN-09-04 (See Section 5 of this report with associated Tables and Annex).	Denmark support the recommendation on establishing a PGECON meeting in 2012.
Annex 7 PLEN-09-01 35/ 5.1. Ecosystem approach and bio-	Based on the above considerations, **STECF recommends** that: – In order to set out a roadmap to further consider the possibilities for implementing an ecosystem approach, a STECF subgroup should be set up under the auspices of STECF-SGMOS, with participation	Denmark is following this work closely.

economic modelling	of ecologists, biologists and economists.	

	− It is recommended to devise the development of such a decision support system in three steps.
	  o In the first step a fisheries information system should be devised. This system, based on marinographic area, should bring together existing data on fish stocks, ecosystem indicators and economic data. For each area an analysis of available and lacking data should be made. Based on this data, ecosystem indicators can be developed.
	  o In the second step for each marinographic area an appropriate set of analytical tools (models) should be devised based on the characteristics of the ecosystem and economic system. It is advised that a preparatory group will prepare a comprehensive overview of available models and applicability to given circumstances. Development of ecosystem models and bio-economic models can be set up parallel, with the bioeconomic models evolving from multi-species models on commercial species to models that include both direct and indirect effects (ecosystem interactions) on commercial and non-commercial species.
	  o In the third part the data base and models should be brought together in a Decision Support System: a data and modelling environment capable of providing an *ex-ante* impact assessment of proposed management measures on the ecosystem and the economic system.
	− A pragmatic first step should be taken to use the tools described in relation to question 1 above, to show changes in the biological status of the species and to include economic information in the assessment.	

STECF recommendations from STECF 11-04	STECF recommends that financial support be found to investigate the potential for surveys that are funded through the DCF to be adapted to maximise their utility in providing information to support other frameworks e.g. the MSFD. Such an investigation should address the need for a Survey Atlas, definition of data needs and priorities, the development of designed-for-	Denmark supports this idea.

	purpose surveys and the integration of DCF-funded and other surveys.	
STECF recommendations from STECF 11-04	STECF recommends that national correspondents/national representatives in ICES, GFCM or other relevant national authorities ensure that information on all surveys performed in their national marine waters are made available for this task.´	All Danish survey data is available.
PGCCDBS sec 3.1	PGCCDBS recommends that reporting of Baltic salmon catch estimates from recreational fisheries on a yearly basis, and for commercial on half year basis, is sufficient (ref. WGBAST 2010 requesting a revision of the DCF Decision 2010/93/EU).	Denmark collect data on recreational catches of salmon on a yearly basis.
STECF-SGRN STECF EWG 11-02, March 2011	PGCCDBS recommends that the proportion of adipose fin clipped salmon and sea trout in Baltic fisheries should be monitored in conjunction with DCF or other data collection programmes (ref. WGBAST 2010) and that RCM Baltic should implement this sampling.	Denmark is awaiting the revision of the DCF.
SGRN 10-01	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.	Denmark do not have any catches on salmon in rivers.

VIII. List of derogations

Denmark request for derogations for at sea-sampling sampling for the following metiérs in the Baltic Region:

Metiérs Level 6	Fishing ground	Reason for applying for derogation
FPN_CAT_>0_0_0	27.SD22-24	Historic sampling information has confirmed that discard (release) for this metiér in periods is higher than 10%. However the survival of the released fish is assumed very high and this metier is therefore not selected for discard sampling.
PTM_SPF_32-89_0_0	27.SD22-24	This is a fishery for herring. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
PTM_SPF_16-31_0_0	27.SD22-24	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
PTM_SPF_16-104_0_0	27.SD25-32	This is a sprat fishery. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.

Denmark request for derogations for at sea-sampling sampling for the following metiérs in the North Sea and East Artic Region:

Metiérs Level 6	Fishing ground	Reason for applying for derogation

OTM_SPF_32-69_0_0	27.I+II	This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, discarding occurs seldom however if it occurs discarding is in large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTB_SPF_32-69_0_0	27.IIIaN	This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, when discarding it occurs seldom but when discarding it is large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTB_DEF_<16_0_0	27.IIIaN	This is a fishery for sandeel. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTM_SPF_16-31_0_0	27.IIIaS	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.
OTM_SPF_16-31_0_0	27.IIIaS	This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted in the harbours. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.

OTB_DEF_<16_0_0	**27.IV+VIId**	**This is a fishery for sandeel. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.**
OTB_DEF_16-31_0_0	**27.IV+VIId**	**This is a fishery for sandeel. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.**
OTB_SPF_32-69_0_0	**27.IV+VIId**	**This is a fishery for herring. Discard occur for this fishery but previous years experience when sampling this metiér has often shown change of fishing pattern when having observer onboard. Furthermore, when discarding it occurs seldom but when discarding it is large quantities. Catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.**
PTM_SPF_16-31_0_0	**27.IV+VIId**	**This is a fishery for sprat. No discard occur for this fishery as all catches are landed unsorted and used for fish meal and oil production. Therefore, catches can be sampled in the harbours. This minimizes the cost for sampling. It is not physical possible for the vessels participating in this fishery to discard the catches when it has been taking onboard.**

No discard occurs in the Danish fisheries carried out for in the North Atlantic Region. The fisheries carried out are the blue whiting fishery and a limited fishery for horse mackerel. Therefore, Denmark request for derogation for discard sampling for this region.

As Denmark is not conducting any research vessel survey in areas and periods where data on fecundity for mackerel and horse mackerel can be collected, Denmark asks for derogation for collecting the data.

IX. List of acronyms and abbreviations

Acronym/Abbreviation	Description
DCCA	Danish Commerce and Companies Agency
DCF	Data Collection Regulation (EC) No 199/2008
DST	Statistics Denmark
DTU Aqua	National Institute for Aquatic Resources
FD	Danish Directorate of Fisheries
FOI	Danish Food and Resource Economics Institute, Denmark
FTE	Full Time Equivalent
IQ/ITQ	Individual quota / Individual transferable quota
ICES HAWG	ICES Herring Assessment Working Group for the Area South of 62° N
ICES SGABC	ICES Study Group on Ageing Issues in Baltic Cod
ICES SGBYSAL	ICES Study Group on the Bycatch of Salmon in Pelagic Trawl Fisheries
ICES SGSIMUW	ICES Study Group on Stock Identity and Management Unit of Whiting
ICES WGBAST	ICES Baltic Salmon and Trout Working Group
ICES WGBFAS	ICES Baltic Fisheries Assessment Working Group
ICES WGDEEP	ICES Working Group on the Biology and Assessment of Deep Sea Fisheries Resources
ICES WGEF	ICES Working Group on Elasmobranch Fishes
ICES WGHMM	ICES Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim
ICES WGMHSA	ICES Working Group on the Assessment of Mackerel, Horse Mackerel, Sardine and Anchovy
ICES WGNEPH	ICES Working Group on Nephrops Stocks
ICES WGNSDS	ICES Working Group on the Assessment of Northern Shelf Demersal Stocks

ICES WGNPBW	ICES Northern Pelagic and Blue Whiting Fisheries Working Group
ICES WGNSSK	ICES Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak
ICES WGPAND	ICES Pandalus Assessment Working Group
ICES WGSSDS	ICES Working Group on the Assessment of Southern Shelf Demersal Stocks
ICES WKISCON	Joint STECF/ICES Workshop on Implementation Studies on Concurrent Length Sampling
WKMERGE	Joint ICES/STECF Workshop on Methods for Merging Fleet Metiers for Fishery based Sampling
WKPRECISE	Workshop on Methods to evaluate and estimate the precision of fisheries data used for assessment
WKSMRF	Workshop on Sampling Methods for Recreational Fisheries
WGWIDE	Working Group on Widely Distributed Stocks
SCV	Standard Catch Value = landings per species multiplied by 3-year average prices.

X. Comments, suggestions and reflections

None

XI. References

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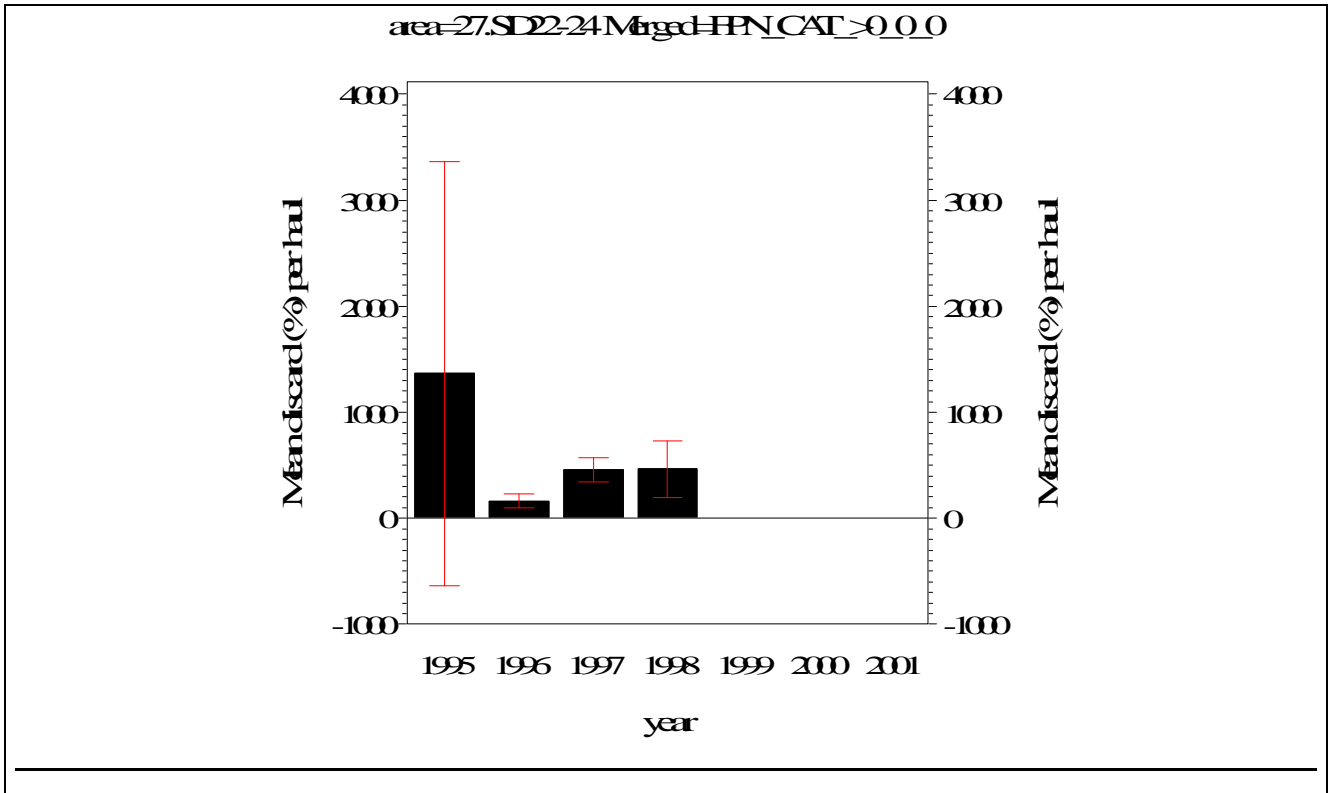
XII. Appendix

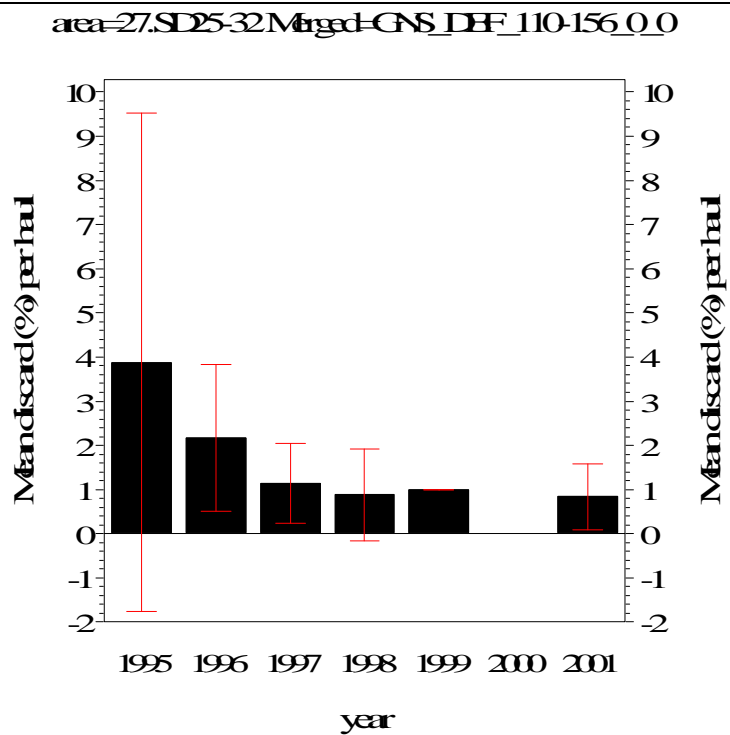Bilateral agreements are attached as appendix 1 to 6.
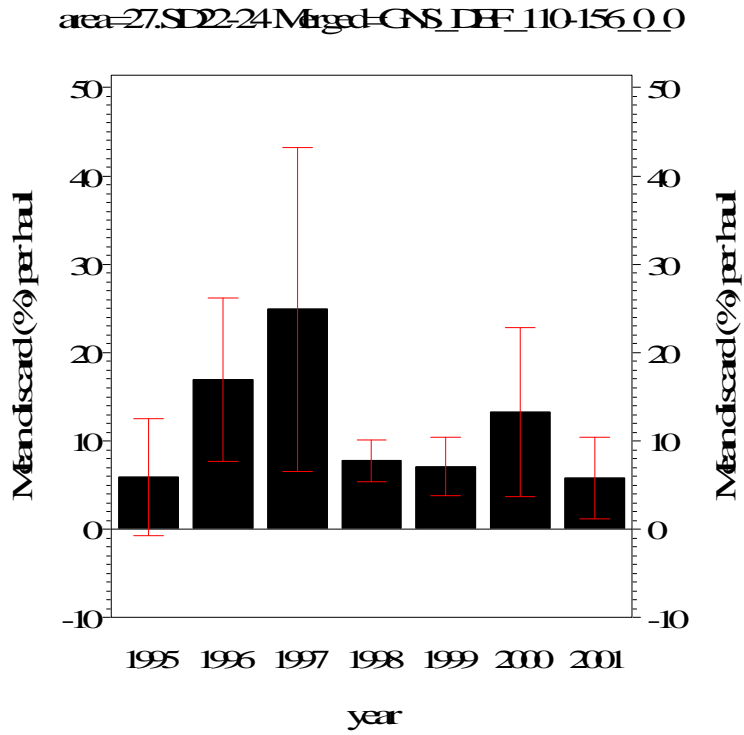
Appendix 7. Derogations

III C 6 – Baltic Derogations and

Figur 7.1 gives an overview of the variability of the discard (%) within each fishing ground, métier and year. In table 7.2 the overall discard (%) within each fishing ground, métier and year is shown together with the number of sampled hauls.

The release (%) is estimated by fishing ground and métier, se table 7.2 for results.

area=27.SD22-24 Merged-GNS_DEF_110-156_0_0

area=27.SD25-32 Merged-GNS_DEF_110-156_0_0

Table 7.1. Overview of discard per year in selected métier (passive gear) 1995-2001 in the Baltic Sea.

Region	Fishing ground	Merged métier	Year	Overall Discard (%)	Number of sampled hauls
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	1995	3	5
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	1996	2	14
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	1997	1	14
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	1998	1	7
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	1999	1	1
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	2000	0	1
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	2001	1	5
Baltic Sea	27.SD25-32	LLS_DEF_0_0_0	1997	0	1
Baltic Sea	27.SD25-32	LLS_DEF_0_0_0	2000	0	1
Baltic Sea	27.SD22-24	FPN_CAT_>0_0_0	1995	476	14
Baltic Sea	27.SD22-24	FPN_CAT_>0_0_0	1996	41	59
Baltic Sea	27.SD22-24	FPN_CAT_>0_0_0	1997	54	237
Baltic Sea	27.SD22-24	FPN_CAT_>0_0_0	1998	385	22
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	1995	4	5
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	1996	7	49
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	1997	14	22
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	1998	6	60
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	1999	6	44
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	2000	9	16
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	2001	7	12

Table 7.2. Overview of discard in selected métier (passive gear) 1995-2001 in the Baltic Sea.

Region	Fishing ground	Merged métier	Overall Discard (%)	Number of sampled hauls
Baltic Sea	27.SD22-24	FPN_CAT_>0_0_0	56	332
Baltic Sea	27.SD22-24	GNS_DEF_110-156_0_0	7	208
Baltic Sea	27.SD25-32	GNS_DEF_110-156_0_0	2	47
Baltic Sea	27.SD25-32	LLS_DEF_0_0_0	0	2

Methods:

The discard (%) in figure x.1 is calculated with the following method

$$Discard(\%)_{per\,fishing\,ground,métier,year,haul} = \left(\frac{\sum Weight.Discard_{Group\,1\,and\,2\,species}}{\sum Weight.Landing_{All\,species}} \right) \times 100$$

The overall discard (%) in table x.1 is calculated with the following method

$$Overall\,Discard(\%)_{per\,fishing\,ground,métier,year} = \left(\frac{\sum Weight.Discard_{Group\,1\,and\,2\,species}}{\sum Weight.Landing_{All\,species}} \right) \times 100$$

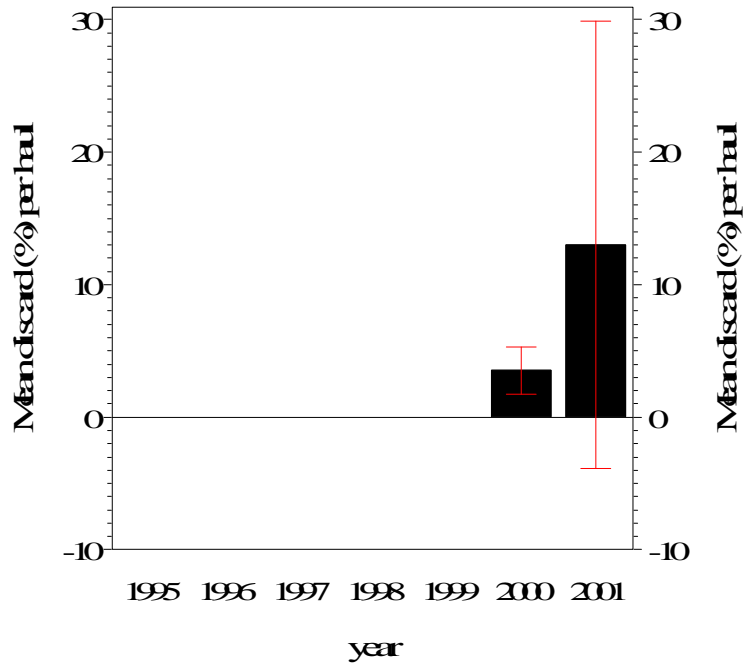The overall discard (%) in table x.2 is calculated with the following method
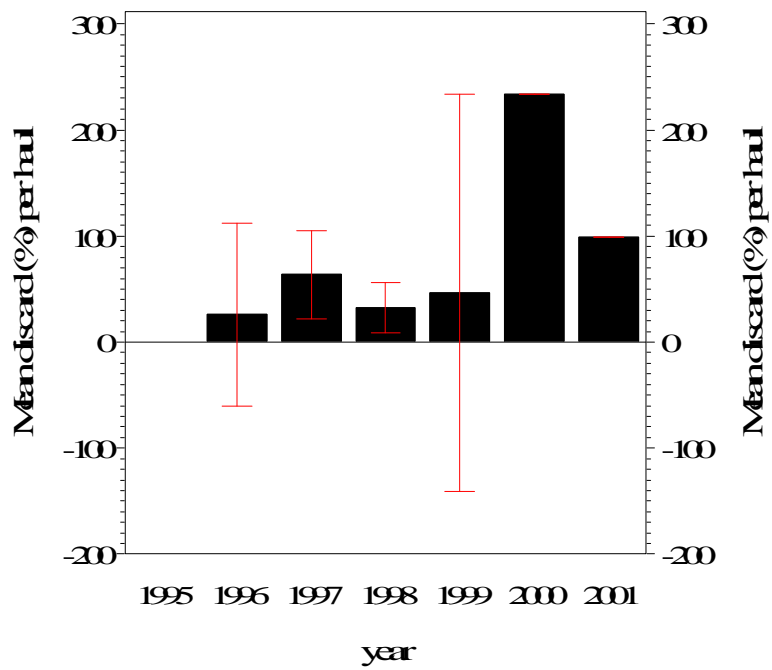
$$Overall\,Discard(\%)_{per\,fishing\,ground,métier} = \left(\frac{\sum Weight.Discard_{Group\,1\,and\,2\,species}}{\sum Weight.Landing_{All\,species}} \right) \times 100$$

III C 6 – North Sea Derogations

area=27.IIIaN Merged=GNS_DEF_120-219_0_0

area=27.IIIaS Merged=GNS_DEF_120-219_0_0

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Figur 7.2. Mean discard (%) per haul, fishing ground and Métier (merged). Confidence intervals at the 95% confidence level.
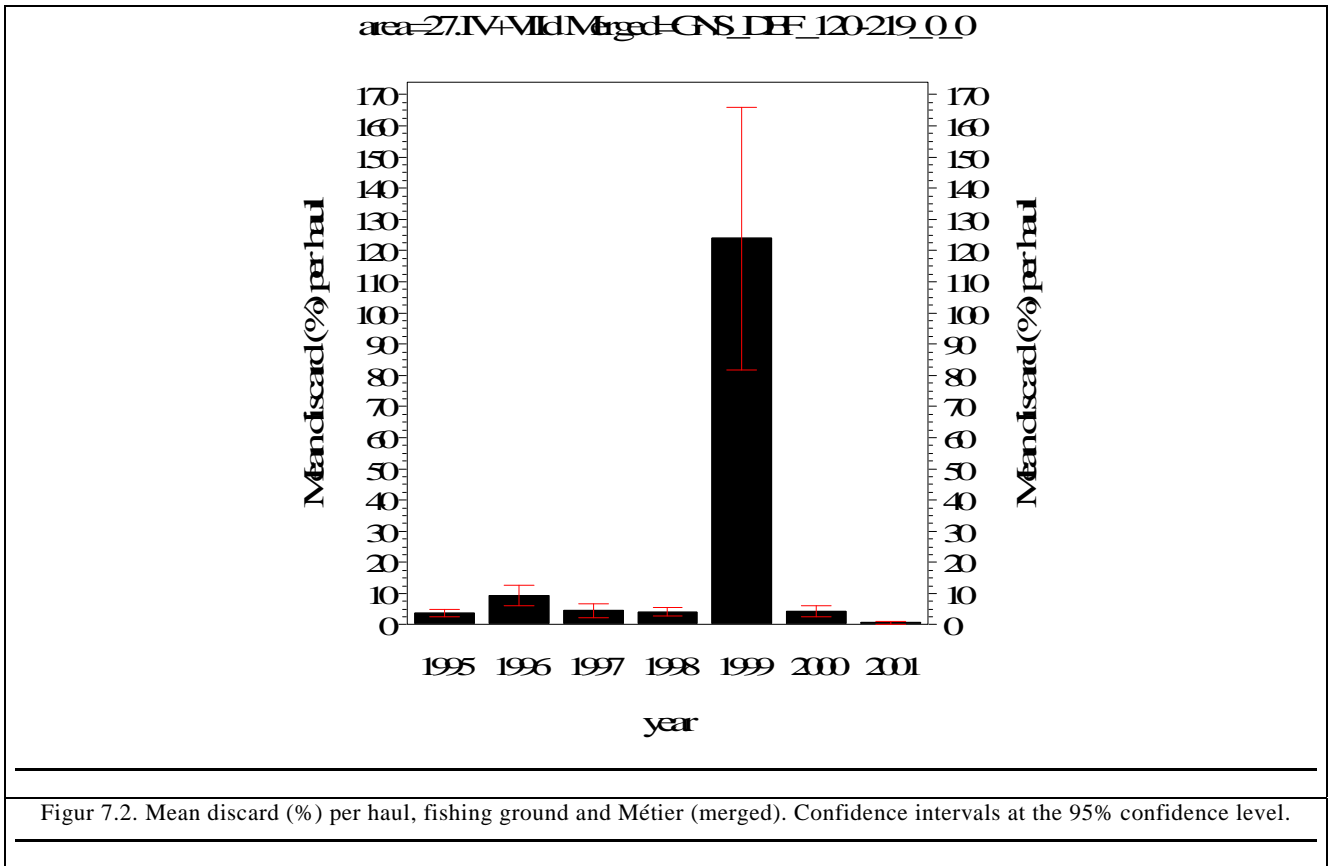
Table 7.3. Overview of discard per year in selected métier (passive gear) 1995-2001 in the North Sea.

Region	Fishing ground	Merged métier	Year	Overall Discard (%)	Number of sampled hauls
North Sea	27.IIIaN	GNS_DEF_120-219_0_0	1995	0	16
North Sea	27.IIIaN	GNS_DEF_120-219_0_0	2000	3	5
North Sea	27.IIIaN	GNS_DEF_120-219_0_0	2001	9	13
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	1996	7	3
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	1997	38	10
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	1998	31	7
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	1999	79	3
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	2000	234	1
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	2001	99	1
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	1995	3	36
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	1996	5	116
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	1997	6	150
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	1998	4	130
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	1999	41	39
North Sea	27.IV+VIId	GNS_DEF_120-219_0_0	2000	3	270

| North Sea | 27.IV+VIId | GNS_DEF_120-219_0_0 | 2001 | 1 | 59 |

Table 7.4. Overview of discard in selected métier (passive gear) 1995-2001 in the North Sea.

Region	Fishing ground	Merged métier	Overall Discard (%)	Number of sampled hauls
North Sea	27.IIIaN	GNS_DEF_120-219_0_0	3	34
North Sea	27.IIIaS	GNS_DEF_120-219_0_0	38	25
North Sea	27.IV-VIId	GNS_DEF_120-219_0_0	8	800

Methods:

The discard (%) in figure x.1 is calculated with the following method

$$Discard(\%)_{per\ fishing\ ground/métier/year/haul} = \left(\frac{\sum Weight.Discard_{Group\ 1\ and\ 2\ species}}{\sum Weight.Landing_{All\ species}} \right) \times 100$$

The overall discard (%) in table x.1 is calculated with the following method

$$Overall\ Discard(\%)_{per\ fishing\ ground/métier/year} = \left(\frac{\sum Weight.Discard_{Group\ 1\ and\ 2\ species}}{\sum Weight.Landing_{All\ species}} \right) \times 100$$

The overall discard (%) in table x.2 is calculated with the following method

$$Overall\ Discard(\%)_{per\ fishing\ ground/métier} = \left(\frac{\sum Weight.Discard_{Group\ 1\ and\ 2\ species}}{\sum Weight.Landing_{All\ species}} \right) \times 100$$