# Annual Report on the Danish National Data Collection Programmes for 2013

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

Copenhagen 31th of May 2014 (Revised 21st of August 2014)

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# I. General framework

This document presents the Annual Report (AR) on the work carried according to the Danish National Programme (NP) for data collection in the fisheries sector for the year 2013. The programme has been carried out 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 AR.

The format of this report is structured following the most recent guidelines from the Commission[1].The AR is structured in a number of modules. In the following chapters a description is given of the activities related to the DCF that have been 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 have been taken into account in this AR.

In addition to this AR a financial report for the 2013 programme has been made. The financial report of the costs is presented in separate spreadsheets in the FinForms formats as provided by the Commission.

In general the Danish national data collection programme has been carried out in 2013 as in the previous years. No major changes to the 2011 and 2012 NP and the 2013 AR has been made accordingly.

Derogations granted

| Short title of derogation | NP proposal section | Type of data - variables | Region | Derogation approved or rejected | Year of approval or rejection | Reason / Justification for derogation |
|---|---|---|---|---|---|---|
| Discard sampling FPN_MDC_>0_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | 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 |

[1] Guidelines for the submission of Annual Report on the National Data Collection Programmes under Council Regulation (EC) 199/2008, Commission Regulation (EC) 665/2008 and Commission Decision 2008/93/EC, Version 2013

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| | | | | | | therefore not selected for discard sampling. |
| Discard sampling PTM_SPF_32-89_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | 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. |
| Discard sampling PTM_SPF_16-31_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | 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. |
| Discard sampling OTB_DEF_90-104_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | This is a very small fishery landing only 170t in average a year mostly conducted on smaller vessels. Therefore it would be very expansive to case the few trips conducted by this metier |
| Discard sampling PTM_DEF_<16_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | 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, |

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| | | | | | | 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. |
| Discard sampling GNS_DEF_110-156_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD22-24 | Approved | Every year since 2008 | 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. |
| Discard sampling GNS_DEF_110-156_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD25-32 | Approved | Every year since 2008 | 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. |
| Discard sampling LLS_DEF_0_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD25-32 | Approved | Every year since 2008 | 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 |
| Discard sampling PTM_SPF_16-104_0_0 | III.C.6 | Discard length/weight information | Baltic 27.SD25-32 | Approved | Every year since 2008 | 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. |

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| Discard sampling OTM_SPF_32-69_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.I+II | Approved | Every year since 2008 | This is a fishery for herring, mackerel. 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. |
| Discard sampling OTB_SPF_32-69_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IIIaN | Approved | Every year since 2008 | 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. |
| Discard sampling | III.C.6 | Discard | NS&EA | Approved | Every | This is a fishery for |

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| OTB_DEF_<16_0_0 | | length/weight information | 27.IIIaN | | year since 2008 | 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. |
| Discard sampling OTM_SPF_16-31_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IIIaS | Approved | Every year since 2008 | 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. |
| Discard sampling PTM_SPF_32-69_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IIIaS | Approved | Every year since 2008 | 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. |
| Discard sampling GNS_DEF_100-119_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since | This is a sole fishery with a very small amount of annual landings |

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| | | | | | 2008 | 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. |
| Discard sampling GNS_DEF_>=220_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since 2008 | 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. |
| Discard sampling OTB_DEF_<16_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since 2008 | 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. |
| Discard sampling OTB_DEF_16-31_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since 2008 | 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 |

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| | | | | | | 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. |
| Discard sampling OTB_SPF_32-69_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since 2008 | This is a fishery for herring and mackerel. 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. |
| Discard sampling PTM_SPF_16-31_0_0 | III.C.6 | Discard length/weight information | NS&EA 27.IV+VIId | Approved | Every year since 2008 | 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 |

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| | | | | | | catches when it has been taking onboard. |
| Discard sampling All fleets | III.C.6 | Discard length/weight information | NA | Approved | Every year since 2010 | 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. A fishery for boar fish started a few years ago, but no discards occur in this fishery.. Therefore, Denmark request for derogation for discard sampling for this region. |
| Salmon genetics | III.E.5 | Genetics | Baltic | Approved | Every year since 2008 | Denmark asks derogation not to carry out any genetically analysis on salmon. |
| Fecundity | III.E.5 | Fecundity | NS&EA | Approved | Every year since 2008 | 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. |
| Transversal data | III.F.2.5 | 'Hours fished', 'Number of rigs', 'Number of fishing operations', 'Number of nets, length', 'Number of hook, number of lines', 'Number of pots, traps' and 'Soaking time' | All regions | Approved | Every year since 2008 | '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".<br>The variables concerning numbers of gear ('Number of rigs', |

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| | | | | | | ‘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. |
| Aquaculture | IV.A.7 | Number of persons employed | All regions | Approved | Every year since 2008 | 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. |

# II. National Data Collection Organisation

## II.A National correspondent and participating institutes

Denmark has assigned the National institute of Aquatic Resources (DTU Aqua), Technical University of Denmark as the coordinating institute in Denmark. Jørgen Dalskov, Senior Fisheries Advisor, Secretariat for Public Sector Consultancy, DTU Aqua has been assigned as the National Correspondent.

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The work in Denmark has been 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. The Danish AgriFish Agency (NAER)** is an agency under the Ministry of Food, Agriculture and Fisheries. The staff of the Danish AgriFish Agency, a total of approximately 1,200, strives countrywide to create the optimal conditions for sustainable growth and green transformation in the fields of:

- Agriculture
- Fisheries and aquaculture
- Plants and horticulture

The aim of the agency is to secure an efficient and professional administration and reap the most benefits from working across our respective areas.

In addition, one of the tasks of the agency are to provide service to the Minister and the political level, assist in law proposals and contribute to international negotiations. Furthermore, NAER is 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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www.agrifish.dk

**3. Department of Food and Resource Economics (IFRO)** 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.

Danish Food and Resource Economics Institute (IFRO)

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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.

Once or twice a year representatives from the involved institutes meet for discussing the coming year or present years programme. Usually these meetings take 1-2 hours. Main topics to discuss are the production and the content of the DFAD data base (see section VI.1 for details) and participation in various expert working group meetings. As it is very clear which of the partners are responsible for the various tasks it is only necessary to make sure deadlines for providing data to each other are agreed.

The daily cooperation can be made by using e-mails or phone calls. The representatives from the involved institutes have been working together for a number of years and therefore, no major disagreements or other issues are troublesome.

The national DCF website is up running. See http://www.dcf-denmark.dk/ It should be mentioned that the platform has been changed and the website needs to be updated with a number of files.

## II.B Regional and International coordination

### II.B 1 Attendance of International meetings

Most of the planned meetings have been attended by Danish representation in 2013. Denmark attended the DCF coordination meetings for the Baltic region and for the North Sea and Eastern Arctic region. The meeting attendance is listed in table II.B.1. All surveys are coordinated internationally by ICES planning groups. The survey planning groups, which were relevant to Denmark the BIFSWG, IBTSWG, WGIPS, WGNAPES were in 2013 attended by representatives from Denmark.

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 and the Netherlands. This bilateral coordination has been continued in 2013.

In the economic field IFRO 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.

Denmark is a member of a large number of ICES WG, WK or PG groups. Those groups which have a major interest for Denmark one or more DTU Aqua staff members participate at the meeting. Some other ICES group meeting have minor interest and DTU staff members only participate at correspondence level and all Danish data is provided to the group. Furthermore, some meetings did not have Danish participation due to conflicting data with regards to other commitments.

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

General recommendations made by RCM Baltic, the RCM NS &EA and the RCM NA from 2007 to 2013 and endorsed at the Liaison meeting and actions taken by Denmark are listed below.

#### Relevant RCM 2007-2013 recommendations

| Source | Recommendation | Action |
|---|---|---|
| RCM NS & EA 2013 | RCM recommends that MS document their interpretation of trips, samples and sampling events and describe what the TripID and SampleID represent in there uploaded data. | Denmark will present the requested information at the 2014 RCM's |
| RCM NA 2013 | MS to document QC and QA procedures in summary for review | Denmark will present |

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| | at the next RCM. | the requested information at the 2014 RCM's |
| RCM NA 2013 | RCM NA recommends that the non-EU share of the research vessel cost for conducting the following surveys is shared among MS according to their EU-TAC shares for the main species concerned: i) the International Ecosystem Survey in the Nordic (Atlanto-Scandian herring), ii) the Blue Whiting Survey (blue whiting). Those MS having a EU-TAC share >= 5% (average TAC 2011-2013) are to be included in the cost sharing. The share is based on the relative share in the total costs of all MS participating. The share will be reviewed mid-term EMFF period. | Denmark is supporting joint survey approach and a cost share model. |
| RCM Baltic 2012 and endorsed by the LM. | Concerning Métier variables - Intersessional work between Sweden and Denmark in order to give the RCM Baltic the possibility to evaluate where task sharing in métier sampling could be achieved. | Denmark, Sweden and Norway have set up a project on developing regional data in the auspices of the Nordic Council. The work will be finalised in 2014. |
| RCM Baltic 2012 and endorsed by the LM. | Concerning Sampling of Métier related variables including foreign landings: Requirement of on-line information on fleet behaviour – In order 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. LM notes that this recommendation is common to the Baltic, NS&EA and NA regions. | DTU Aqua has online access to VMS |
| RCM Baltic 2012 and endorsed by the LM. | The RCM Baltic 2012 recommends that landings should not be sampled abroad by landings countries as these data cannot be used but should be compensated by the flag countries by a higher sampling level in the flag country. | Denmark has made agreement with other MS following this recommendation. |
| RCM Baltic 2012 | RCM Baltic recommends that some standard reports should be estab-lished in FF that present overview of sampling intensities in maps, tables and figures. The reports would give the regional coordination, assessment working groups and other end users an overview of the quality of the data in an efficient way. | Denmark is supporting this idea and is actively working in the RDB Steering Committee for developing these tables |
| RCM NS&EA 2012 Recommendation | RCM NS&EA 2012 recommends to review the summaries on the derogations reached during RCM NS&EA 2011, to provide a final list of current derogations. From these lists the Liaison Meeting could review the derogations and where appropriate put forward a list of derogations that could be approved to cover | Denmark included a list of derogation in this AR 2012. |

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| | métiers across all RCM's. | |
| RCM NS&EA 2012 Recommendation | Access to data hold in RDB-FishFrame is restricted to persons with a password. Different roles are defined within the system and different users have access to a certain level of data and functionalities. To facilitate future regional coordination work it is recommended that members in the RCMs are given a specific role in the system in accordance with their needs. | Denmark support this recommendation. |
| RCM NS&EA 2012 | Where it was identified that bilateral agreement is required, according to the rules agreed upon at the RCM NS&EA 2011 and endorsed by the LM8 and STECF 11-19, MS are requested to establish or update a bilateral agreement on sampling of landings abroad. | Denmark has made bilateral agreement with a number of MS. |
| RCM NS&EA 2012 Recommendation | RCM NS&EA recommends that the Oostende declaration is reviewed by RCM NA, RCM Baltic, the Liaison meeting and STECF EWG 12-15 as the appropriate framework for proposing, carrying out and reporting on regionally coordinated data collection from commercial marine fisheries under the proposed DC MAP. | Denmark supports the idea behind the Oostende Declaration. |
| RCM Baltic 2011 | 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. | DTU-Aqua has online access to VMS data and logbook information |
| RCM Baltic 2011 | 1. MS should upload all landing data into the Regional Data Base allowing the RCM to analyse the possible needs for bilateral agreements.<br><br>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.<br><br>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 has uploaded all relevant data to the RDB |
| RCM NA 2011 | RCM NA recommends that the collection of otoliths of John Dory is continued but not proceed with age readings until an agreed standardised method is developed. | Denmark has none or insignificant catch of John Dorry. |
| RCM NA 2011 | RCM NA recommends MS to describe in detail the methodology | Denmark has no |

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| | on the separation of the catches of the 2 Lophius species. This information should be available to the 2012 benchmark assessment. | significant catch of Lophius sp. |
| RCM NA 2011 | RCM NA recommends MS to check in their NP proposal 2012 that sufficient coverage of deep-water fisheries on-board sampling is planned, in order to meet the EWG needs. | Demark has no deep-sea fishery. |
| RCM NS & EA 2011 | 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), Commercial Effort (CE) and Commercial Samples (CS) records for 2010 and 2011. | All relevant data is uploaded to RDB FishFrame. |
| RCM Baltic (2010) | In order to move forward and get data into FF, a workplan was set up to support the MS in the upload process. Landing data, sampling and effort data for 2009 was agreed to be uploaded by all MS before 1 Sept 2010. | Denmark uploaded the data as agreed. |
| RCM Baltic (2010) | 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 has used a lot of effort during 2010 to learn how to use cost and participated in the workshop. |
| RCM Baltic (2010) | In order to be able to analyse the current sampling level of sprat in the Baltic and suggest optimal sampling levels for future regional coordinated sampling, the data must be available in an agreed format and checked for errors. Data has to be uploaded in Fishframe All MS should upload 2009 sprat data into Fishframe before the end of October 2010. | Denmark has uploaded the requested data |
| RCM Baltic (2010) | 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 fully support the idea of task sharing and welcomes the discussion to take place between NC´s. |
| RCM NS & EA | RCM recommended that MS start to implement COST | Denmark has put a lot of effort to implement |

| | | |
|---|---|---|
| (2010) | | and use cost, but are having severe challenges as the COST do not support size grade sampling |
| RCM NS & EA (2010) | In order to have correct reference list of species and stocks in Appendix VII 2010/93 and to avoid inconsistencies and errors in the tables filled in by MS in their NP proposals RCM NS &EA made a recommendation to establish a reference list for revision of the guidelines and templates for future NP proposal | Denmark has acted according to this recommendation. |
| RCM Baltic (2009) | In order to make analyses of the data collected within DCF and to optimize the coordination work, the developed regional database FishFrame 5.0 should be used within the RCM Baltic. | Denmark has uploaded most of the data for 2009 and will upload all data for 2007 and onwards for all species and all metiers at level 6. |
| RCM Baltic (2008) | In order to use the time of the RCM more efficient, the pre-processing of the exchange data tables, namely the merging of the data on fisheries statistics and planned sampling NP proposal tables in the NPs, for the harmonization of the NPs, including the quality checks, should be carried out before the next RCM. | Denmark actively participated in the work for the 2009 and 2010 before and at the RCMs. |

# III. Module of the evaluation of the fishing sector

## III.A General description of the fishing sector

The number of vessels registered for Denmark in the Community Fishing Fleet Register on the 1st of January 2012 was 2,784, of which 1,094 had no activity in 2012. The 1,690 vessels which were active during 2012 had landings of fish to a total value of EUR 328 million or 87.1 per cent of the total value of the Danish fishery in 2012. The remaining 12.9 per cent of the value of the Danish fishery in 2012, totalling EUR 49 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 2012.**

| | 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 length groups | ---------- Active registered vessels ---------- | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| <10 m | 1,106 | 51 | 66 | 9 | 24 | 1,256 |
| 10 - <12 m | 113 | 10 | 16 | 2 | - | 141 |
| 12 - <18 m | 232 | 32 | 31 | 16 | - | 311 |
| 18 - <24 m | 73 | 10 | 15 | 4 | - | 102 |
| 24 - <40 m | 30 | 8 | 9 | 1 | - | 48 |
| 40 m and above | 20 | 5 | 10 | 4 | - | 39 |
| All length groups | 1,574 | 116 | 147 | 36 | 24 | 1,897 |
| Total value of landings in 1000 EUR | 306,102 | 22,215 | 46,029 | 2,545 | 102 | 376,993 |
| Per cent share of value of landings | 81.20% | 5.89% | 12.21% | 0.67% | 0.03% | 100.0% |

During the year 2012 an additional 357 vessels were registered of which 183 vessels became active. So the total number of Danish vessels with landings of fish in 2012 was 1,873. 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 24 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.

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.

## III.B Economic variables

**Supra Region: Baltic Sea, North Sea and Eastern Arctic, and North Arctic.**

The total volume of the Danish fishery in 2012 was 499,285 tonnes to a value of 377 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.

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

The harmonized account for fishery was restructured in 2010 to include a table for calculation of an estimated value of the individual fishing rights (the vessel quota shares). The capital value of the quotas is calculated using the live weight quantities of fish equalling the quota share for the year for each fishing firm multiplied with shadow prices for every quota species.

In 2012 the system for measuring capital value of the quotas has been further improved. Instead of enumerating the value of the fishing rights based on the estimated values from the sampled accounts, it was decided to calculate the value for each individual owner of fishing rights by using registered data on quota transactions. All individually held quota rights are registered on the administrative database in the Danish Agrifish Agency. The registration covers initial relative shares and quantities on each quota stock for all individual quota owners, plus all subsequent transactions in shares and quantities during the year.

The estimated value of fishing rights for each quota owner is accommodated into the account for the production unit for that owner. That goes both for sampled and simulated (see below) accounts.

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

In Denmark we use a harmonized balanced accounting form to collect the economic data. In 2012 the sample included 276 accounts, 43 per cent, of the 641 unit frame population.

From 2012, a new system for calculating the statistical variables from the sampled accounting data has been taken into use. We now simulate individual accounts for every unit in the population that is not in the sample. These simulations are done by selection of one to three of the sampled accounts that are valuated to be best possible replacement for the simulated unit, and calibrate the average of the 1 to 3 matching units to equal the registered revenue and of that unit.

The simulations are performed using a BANFF MASSIMPUTATION model in SAS. Donors are matched according to known registered data for catches on selected species, crew size, engine power and days at sea in Ices III and Ices IV.

Statistics Denmark are in the process of implementing the ESS Quality and Performance Indicators (QPI) outlined by Eurostat (ESTAT/B1/AB D (2012)) and will include these indicators in the New Quality Declarations which will be produced for all statistics. That is scheduled to be completed in 2014. Hereafter we will include the Quality Declaration in the AR.

### III.B.3 Follow-up on Regional and international recommendations

No action is needed.

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

We are in the process of reconstructing the system to build the database for the account statistics from the administrative databases in the Directorate.

One important issue for the new system is to ensure homogeneous identification of production units and thereby segmentation of economic data and logbook data (landings and effort specified at FAO level 4). As it is now, the production unit for logbook data is based on the vessel identification number with no control on whether the ownership of the vessel shifts over the year, whereas the production unit for economic data is based on vessel versions, which is a vessel in a period with the same owner.

Another improvement will be, that the production from the fishery accounts, both quantity and value (income from sales of fish), in future reports will be data from the same source (the administrative registers) for all production units. As it is now, both total income and total cost are calculated based on a sample of accounts. In the new system all registered data from catch, landings and sale of fish will be combined on each active production unit (vessel), thus only cost and financial data should be calculated from the sample of fishery accounts.

### III.C Metier-related variables

The Danish NP concern sampling schemes for three areas the Baltic Sea (ICES areas III b-d), the North Sea (ICES areas IIIa, IV and VIId) and Eastern Arctic (ICES areas I and II) and North Atlantic (ICES areas V-XIV and NAFO areas).

DTU Aqua has used the AgriFish Agency databases and combined logbook data with the sales slip data and vessel register data and created a database; the DFAD. Here total annual commercial landings by métier can be provided by all species and areas, according to level 2, level 3, level 4, level 5 and level 6, of geographical disaggregation according to Appendix II of Commission Decision 2010/93/EC. The figures are based on all recorded landings stored in this database. The recorded landings in this database are census data.

Results of the sampling in 2013 in relation to what was planned are presented in tables III.C.3, III.C.4, III.C.5 and III.C.6. The achievements of sampling in 2013 were at a similar level compared to 2012, however the sampling design has improved. A main overall reason for deviations from what was planned is that it sometimes can be difficult to predict fishing pattern by metier for the sampling year at the time of compilation of the National Programme. Also, to have a statistically sound sampling design, random sampling is one of the most important items, indicating that if sampling is 100% random it is not always possible to target all events. When sampling is conducted at shore; in harbours or at markets, all information on the metiers is selected. However, the sampling frame is not conducted by metier but by species and sorting groups. Therefore we cannot always assure that all metiers have been samples although the numbers of fish measured and aged are in accordance with the program. Denmark has in 2010 initiated a work to improve the sampling design of the metier based sampling following the outcomes of ICES WKACCU and WKPRECISE. This outcome has led to a change in the sampling frame from 2011 to a more statistically sound sampling program were trips are the primary sampling unit. As the trips are randomly selected in a database, based on the numbers of trips by the vessel the

year before, large changes in fishing pattern between years can affect the sampling. As the new system is selecting the vessels randomly, the logistics have become a bigger challenge as we have to travel more to Islands and enter the vessels from rather small ports. The numbers of different vessels selected for the observer program has increased with 30% by this system. However, it has at least in the first year been at the expense of numbers of trips conducted. The main part of the deviations in 2013 from the aim is caused by the logistic more challenging system and is expressed below on a metier basis.

## Baltic Sea (ICES areas III b-d)

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

Deviation from sampling on shore and at sea

***Bottom otter trawl targeting demersal fish (OTB_DEF >=105 1 120), sub 22-24 and 25-32***

In the western Baltic 66 % (23) of the planed observer trips at sea and 62% (34 samples) of the planned harbour sampling were conducted for this area. This métier had a decreased in effort between 2013 and the reference year (16%). For 25-32 the Eastern Baltic 89% (25) of the planed observer trips at sea and 58% (23) of the planned harbour sampling were conducted for this area. As stated in the IIIC we do not target metiers in the harbour sampling but species and sorting size groups indicating we cannot guaranty that we will achieve the planned number of samples. For both the western and especially the eastern Baltic the cod quota was not utilized, were 75% of the western quota was utilized and only 39% of the Eastern cod quota. Indicating that although there has not been a large decrease in the effort, there has been a large decrease in the landings.

***Bottom otter trawl targeting demersal fish (OTB_DEF_90-104_0_0), sub 22-24***

For this metier OTB_DEF_90-104_0_0 the numbers of commercial trips conducts decreased with more than 50% from the reference years to 2013 and the numbers of harbour trips conducted were also only 25% of the planned numbers of trips. But again, Aqua do not sample directly for metiers in the harbour but for stocks and sizes.

***Set gillnet fisheries targeting demersal fish (GNS_DEF_110-156_0_0), sub 25-32 and 22-24***

In 2013 Denmark sampled a total of 35 (75%) trips in this metier in the Baltic, however none of the trips for this metier were sampled in subdivision 25-32 and 100% of the trips is conducted in 22-24. The main reason of the under sampling is duo to the fact that the grey seal population has increased in later years making gillnet fishery very challenging in the Island of Bornholm. The effort in this metier has also decreased by 60% in 2013 compared to the reference year.

***Bottom pair trawl targeting small pelagic (PTM_SPF_16-31_0_0and PTM_SPF_16-104_0_0), sub 25-32 and sub 22-24.***

Denmark has in 2013 had a very large decrease (close to 60%) in fishing effort for sprat in the Eastern Baltic. At the same time Denmark has sign a bilateral agreement with Poland, were Poland is conducting there sampling on board Polish vessels. Furthermore there is a typing mistake (was also in the report last year and not corrected) in

the planned numbers of samples in the Baltic, were we in last updated annual report increased the number of samples from 16 to 136. This is off course a mistake and the correct number should have been 50. In total 49 samples were taking for this metier.

***Bottom pair trawl targeting small pelagic (PTM_SPF_32_89_0_0), sub 22-24.***

In the western Baltic Sea the herring fishery has increased the effort in 2013 compared to the reference year and therefore also the sampling intensity. 10 trips were planned and 17 conducted (70% increase).

***Longline fisheries targeting demersal fish (LLS_DEF_ALL_0_0), Sub 25-32***

In 2013, 50% of the planned trips were conducted from this métier. Again the metier is very small compared to the trawlers and when sampled in harbours or at market our sampling frame is species and sorting size groups and not metiers, therefore we can risk not to fulfil the sampling level of the less important metiers. Furthermore there was a decrease in effort on 50% from the reference years to 2012. 5 out of 10 trips were conducted for this meter.

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

Denmark has estimated CV's with the method described in Appendix 1.

Denmark in 2011 implemented a new design of the metier at sea sampling programmes on the basis of the outcome of the ICES workshops WKACCU, WKPRECISE and PGCCDBS. The work includes identification of proper sampling frames and probability based ways to select primary sampling units. The new design has also been used in 2013 and has improved the possibilities to evaluate possible bias and thereby also accuracy. Furthermore, refusal rates are now recorded for all sampled metiers from the on board sampling programme.

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

No recommendation from 2013 relevant to Denmark.

## III.C.4 Actions to avoid shortfalls

In 2010-2011 a proper statistically sound sampling frame was developed and implemented in the observer program. This has reduced some of the problems mentioned in ICES WKACCU and WKPRECISE and latest WKPICS in 2012 as to avoid shortfalls. However, the new sampling program has in practice been more difficult to implement than expected mainly, due to the increased logistics problems that arise when vessels are randomly selected from a database (vessels with homeports on small islands, skippers that we do not normally have contact with ect.). However, some of the obvious pitfalls are avoided, such as only selecting a well-known part of the fleet, to have a clear procedure on how to follow up on refusal and to collect this information. Furthermore Denmark is now weighing the possibility of selecting a vessel, with the numbers of trips conducted by the vessel,

thereby avoiding having an oversample of vessels not conducting the main part of the trips. The larges advances with the system are the increased number of vessels included in the sampling. The numbers of vessels have increased by 30% and as it has been shown in other studies that the main part of the uncertainties is between vessels, it makes good sense to increase the number of ships to be sampled. Another reason for inconsistencies between planned no of trips and achieved number is the dynamic in the fishery making it difficult to predict spatial and temporal fishing patterns for some metiers at the time of planning the NP. However, with the new system we try to follow the fishery by calling the selected fisherman and if he is going on a trip, we are obliged to sample according to the DCF, we will conduct the trip although it is conducted in another area and with another metier. The improved Danish sampling program, in place since 2011, has incorporated refusal rates from the random selected fishermen giving a much better overview of the bias in the sampling program in connection to the sampling population and the coverage of this. In 2012 and 2013 some smaller improvements have been incorporated in the designs to make it more operational and user-friendly. The design has also been presented in international working groups (WKPICS I and II and SGPIDS III) where standardization towards other MS designs has been incorporated.

## North Sea (ICES areas IIIa, IV and VIId)

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

Deviation from sampling on shore and at sea

***Beam trawl targeting crustaceans (TBB CRU 16-34 0 0), sub IV+VIId***

125% (10 trips) of the planned Crangon fishery was covered. In this fishery the landed part of the catch is sampled on board and brought back to the institute for analysis on sex and maturity. For this reason the numbers of trips on shore is identically to the numbers of trips at sea. Effort in the metier has been increased slightly since the reference year

***Bottom otter trawl targeting demersal fish (OTB_DEF<16 0 0), sub IV+III+VIId***

The sand eel fishery has always been covered very detailed in especially the North Sea were the main part of the fishery is conducted but also in IIIa, by Denmark as we are the main nation fishing on this species. Close to half of the samples are normally fishermen “self-sampling” and therefore the level of samples can be very variable. A large effort has been put to optimise the sandeels sampling program and a minimum of 30 samples by month and sandell area is collected. Both self-sampling and control samples are used in the program. The self-sampling samples have a higher quality duo to the extra information on position and the samples are frozen right away but to assure the correctness of the samples the results are compared with the control samples. In 2013 71% (171 samples) of the planned level was conducted. In 2013 the fishery was conducted in a very small area. Therefore the number of samples worked up was decreased as the extra information gathered if all are fishing within the same square at the same time is limited. In IIIa 68% (122 samples) of the planned sample level was achieved. 2 samples from IIIaS were also sampled, although this sand eel fishery is a very limited fishery compared to the North Sea it has been increasing in later years.

***Bottom pair trawl targeting small pelagic (PTM_SPF_16-31_0_0), sub IV+VIId and IIIa***

This metier has been sampled in 2013 by 103% (62 samples) in IV and 41% (9 samples) in IIIa. The reason for the low sampling effort in IIIa is the very low quota uptake (5%). The fishermen are stating that the by-catch of herring is too high for them to be within the regulation, therefor they have not been able to fish the quota. A self-sampling program among fishermen started up in 2011 as the quality of the "fishermen samples" were much better (more precise information and the samples are freshly frozen), this sampling system gives us good quality data if there is a fishery as indicated in the North Sea. However, the sampling level is relatively difficult to know in advance. This new sampling system has improved the spatial sampling and is very cost effective. The samples from the control are still used as reference and to make sure that samples are always available.

***Bottom otter trawl targeting crustaceans (OTB_MSD_>=120), sub IV+VIId***

The at-sea sampling program oversampled with 63% (13 trips compared to the planned 8 trips). The meiter is also very well covered at the harbour sampling were 52 samples (130%) were conducted (There was a mistake in the programme were harbour samples between OTB_MCD 70-99 and >120 was swapped were 4 samples were planned for larger metier and 40 samples for the small metier in the NP.

***Bottom otter trawl targeting crustaceans (OTB_MCD_70-99 0 0), sub IV+VIId***

This metier is a limited fishery and has decreased even more with 25% compared to the reference year. Only 25% of the planned at sea monitoring was covered in this metier. Effort has between 2013 and the reference year decreased by 40%. The trip level from this metier is presently so low, that the random selection will only very seldom select the metier.

***Bottom otter trawl targeting small pelagic (OTB_DEF_16-31_0_0) sub IV+VIId***

The Norway-pout fishery in the North Sea was very small in 2013 although a relative large quota only 21% (36 000 t) of the quota was utilized. 47 samples were collected and although this is only 78% of the planned it is indicating that at landing levels the sampling level was appropriate.

***Bottom otter trawl targeting Crustaceans (OTB_CRU_32-69_0_0), sub IV and IIIa***

This shrimp fishery in the North Sea was not sampled. And the effort in this area has decreased to only 38 tips in 2013. However, the fishery in the Skagerrak where the main part of this fishery (95%) is conducted the fishery is adequate sampled. One reasons for this difference is that the fisherman rather late in his planning is deciding which of the two areas to target.

***Bottom pair trawl targeting small pelagic (OTB_SPF_32-69_0_0), sub IIIaN and sub IV+VIId***

The fishing effort in Skagerrak has for all pelagic fisheries been at a very low level in 2013 (34 trips) and only 31% of the quota was utilized The planned level of samples (40) is therefore sat unrealistic high. 4 samples were collected in 2013 for Skagerrak. In the North Sea (IV) the effort increased in contrary to Skagerrak, with 85% and the sampling effort also increased by 70% (85 samples).

***Bottom otter trawl targeting crustaceans (OTB_MCD_90-119 0 0), sub IIIaN and IIIaS***

The at sea sampling program was conducted with an oversampling of 34 trips compared to the planned level of trips 12 trips. At the same time 61 of the planned 70 harbour trips were fulfilled in 2013 in IIIaN. The Same pattern is evident in Kattegat (IIIaS) were 55 at sea trips were conducted compared to 42 trips planned. 43 harbour samples (of 40 applied) were conducted in land. The reason for the oversampling at sea is our new sampling design were a trip is the primary sampling unit – given a higher weight in areas were a lot of 1 day trips are conducted compared to longer trips. Both Kattegat and Skagerrak have nearly only 1 day trips.

***Set gillnet fisheries targeting demersal fish (GNS_DEF_120-219_0_0 and GNS_DEF_100-119_0_0), sub IIIaN***

The "at sea monitoring" was over sampled by 47%. This is mainly due to a very well-functioning and cost effective self-sampling program for gillnetters in IIIaN. The harbour samples were also very well samples with 42 achieved samples were only 20 samples were planned for. However for the metier with smaller mesh sizes 100-119, 1 sample was achieved instead of the planned 2 samples.

***Set gillnet fisheries targeting demersal fish (GNS_DEF>220), sub IV***

The harbour samples from the gillnetters with large mesh since were achieved at 75% of the planned level. This is due to the way the sampling frame is set up for harbour sampling were species and sorting groups are the PSU.

***Set gillnet fisheries targeting demersal fish (GNS_DEF>220), sub IV***

The harbour samples from the gillnetters with large mesh since were achieved at 75% of the planned level. This is due to the way the sampling frame is set up for harbour sampling were species and sorting groups are the PSU.

***Set gillnet fisheries targeting demersal fish (GNS_DEF_90-99_0_0), sub IV***

***None of the planned harbour samples were archived for this metier. The Danish harbour sampling program have stock and size sorting as PSU and therefore number of samples per metier are base om post-stratification.***

***Set gillnet fisheries targeting demersal fish (GNS_DEF_120-219_0_0 and GNS_DEF_100-119_0_0), sub IV***

The "at sea monitoring" was over sampled by 225%. This is mainly due to a very well-functioning and cost effective self-sampling program for gillnetters in IV. The harbour samples were achieved at the planned level

***Bottom pair trawl targeting small pelagic (PTB_SPF_32-69_0_0), sub IIIaS***

This métier has only been sampled at 10% (1 sample) in 2013. The reason for this is a low effort in the area however, extra effort will be enfaced in 2014 to increase the sampling level in the area.

***Anchored seine targeting demersal fish (SDN_DEF_90-119_0_0), sub IIIaS and IIIaN***

This metier has vanished in Kattegat in 2013 and has therefore not been sampled. In Skagerrak 100% of planned trips at sea has been conducted and in harbour the metier has been oversampled with 27 trips compared to the planned 4.

***Midwater otter trawl targeting small pelagic fish (OTM SPF 32-69 0 0), sub I and II***

In last years updated NP the sampling level for this metier were changed from 8 planned samples to 25. This was probably an overestimation of the sampling level and 4 samples were archived. Also the effort has decrased by 50% between the reference years and 2013 and is now only conducting 16 trips. This will be corrected in the updated NP. The metier is a herring and partly mackerel fishery.

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

Denmark has estimated CV's with the method described in Appendix 1.

Denmark in 2011 implemented a new design of the metier at sea sampling programmes on the basis of the outcome of the ICES workshops WKACCU, WKPRECISE and PGCCDBS. The work includes identification of proper sampling frames and probability based ways to select primary sampling units. The new design has also been used in 2013 and has improved the possibilities to evaluate possible bias and thereby also accuracy. Furthermore, refusal rates are now recorded for all sampled metiers from the on board sampling programme.III.C.3 Follow-up of regional and international recommendations.

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

| **Source** | **Recommendation** | **Action** |
|---|---|---|
| RCM NS & EA 2013 | RCM recommends that MS document their interpretation of trips, samples and sampling events and describe what the TripID and SampleID represent in there uploaded data. | Denmark will present the requested information at the 2014 RCM's |

## III.C.4 Actions to avoid shortfalls

In 2010-2011 a proper statistically sound sampling frame was developed and implemented in the observer program. This has reduced some of the problems mentioned in ICES WKACCU and WKPRECISE and latest WKPICS in 2012 as shortfalls to avoid. However, the new sampling program has in practice been more difficult to implement than expected mainly, due to the increased logistics problems that arise when vessels are randomly selected from a database (vessels with homeports on small islands, skippers that we do not normally have contact with ect.). However, some of the obvious pitfalls are avoided, such as only selecting a well-known part of the fleet, to have a clear procedure on how to follow up on refusal and to collect this information. Furthermore Denmark is now weighting the possibility of selecting a vessel, with the numbers of trips conducted by the vessel, thereby avoiding having an oversample of vessels not conducting the main part of the trips. The larges advances with the system (besides the unbiased results) are the increased number of vessels included in the sampling. The numbers of vessels have increased by 30% and as it has been shown that the main part of the uncertainties is between vessels it makes good sense to increase the number of ships to be sampled. Another reason for inconsistencies between planned no of trips and achieved number is the dynamic in the fishery making it difficult to predict spatial and temporal fishing patterns for some metiers at the time of planning the

NP. However, with the new system we try to follow the fishery by calling the selected fisherman and if he is going on a trip, we are obliged to sample according to the DCF, we will conduct the trip although it is conducted in another area and with another metier The improved Danish sampling program since 2011 has incorporated refusal rates from the random selected fishermen giving a much better overview of the bias in the sampling program in connection to the sampling population and the coverage of this. In 2012 and 2013 some smaller improvements have been incorporated in the designs to make it more operational and user-friendly. The design has also been presented in international working groups (WKPICS I and II and SGPIDS III) where standardization towards other MS designs has been incorporated.

## North Atlantic (ICES areas V-XIV and NAFO areas)

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

**Midwater otter trawl targeting small pelagic fish (OTM SPF 32-69 0 0), sub VII and VIII**

The metier has earlier been targeting blue whiting fishery and has not been conducted in 2010 and 2011. However, a new Danish fishery on Boarfish started in 2009 and this fishery has since then been sampled for providing data for carrying out stock assessment analyses on this species. Therefore this metier is oversampled by 7% (32 samples instead of the planned 30).

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

See Baltic section

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

| Source | Recommendation | Action |
|---|---|---|
| RCM NA 2013 | MS to document QC and QA procedures in summary for review at the next RCM. | Denmark will present the requested information at the 2014 RCM's |
| RCM NA 2013 | RCM NA recommends that the non-EU share of the research vessel cost for conducting the following surveys is shared among MS according to their EU-TAC shares for the main species concerned: i) the International Ecosystem Survey in the Nordic (Atlanto-Scandian herring), ii) the Blue Whiting Survey (blue whiting). Those MS having a EU-TAC share >= 5% (average TAC 2011-2013) are to be included in the cost sharing. The share is based on the relative share in the total costs of all MS participating. The share will be reviewed mid-term EMFF period. | Denmark is supporting joint survey approach and a cost share model. |
| RCM NA | MS to document QC and QA procedures in summary for review at the next | Denmark will present the requested |

| | | |
|---|---|---|
| 2013 | RCM. | information at the 2014 RCM's |

No other RCM NA or LM recommendations related to this region are relevant to Denmark.

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

See under Baltic Sea

### III.D Biological - Recreational fisheries

In order to estimate 2013 cod, eel and sea trout harvest (fish caught and kept) in the Danish angling and passive gear fishing, interview survey has since 2009 been conducted by DTU Aqua in cooperation with Statistic Denmark. To estimate 2013 data two interview surveys were conducted in July 2013 and January 2014.

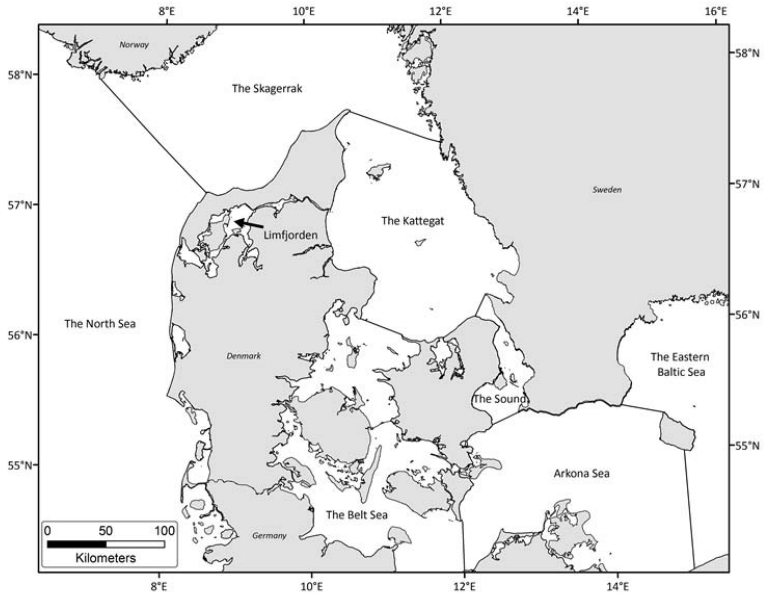
Denmark and DTU Aqua developed a concept for a combined telephone and internet survey for the Danish recreational fishery. To estimate the seasonal and annual fluctuations in the catches the survey are intended to be conducted on a half yearly basis during the next years.

In 2013 two surveys was conducted resulting in a recall period on 6 months. None of the surveys included catches of Baltic salmon, since it was judged to be a fishery not suited for the sampling approach used in present survey. This is simply because the fraction of anglers practicing this fishery is believed to be very low. The surveys have since 2012 also included the catches of sea trout in marine waters.

The interview survey presented in this report was separated into two different phases with different aims, own questionnaires and group of respondents: 1) The Omnibus and 2) Fishery License holders. The main objective of the omnibus interview was to estimate the size of the population that fished without a license and with what effort. The Omnibus is a monthly survey conducted by Statistic Denmark wherein questions are asked on behalf of e.g. companies, newspapers and research institutes. The omnibus was only conducted once in 2009 and 2010 as the results from this interview are not likely to change much since 2009 the surveys have been conducted.
The "licence list survey", specifically targeted that part of the Danish population with a valid annual fishing licence. When a licence is issued, the Danish social security number of the purchaser is registered, providing an efficient way to contact these persons. However, the list does not cover: (i) tourists (since they do not have a Danish social security number), (ii) those fishing without a valid licence, and (iii) people with a valid reason not to have a licence.
The license list survey was conducted twice covering the period from January to June and July to December 2013.
The survey was divided in 9 different subareas; the North Sea, Skagerrak, Kattegat, the Limfjord, the Belt Sea, the Sound, the Arkoma Basin, the East Baltic and fresh Water. As all catches has been reported by quarter in these subareas it is possible to get the recreational catches by region. However, the method used is similar for all regions.

In the first interview survey 2305 persons holding a licence was contacted and 1113 responded (48.3%) in the second half 2522 persons holding a licence was contacted and 1191 responded (47.2%)

Preliminary results from the interview survey is shown in table 1.




The sub areas in which the survey interview was divided.

Anglers - domestic as well as tourists - between 18 and 65 years of age have to purchase a license for a year, week or day. All passive gear fishers have to have an early license and you are not allowed to fish before the age of 12. The license is personal and non-transferable.

For further information under Baltic Sea and later this year a report will be published ("Eel and cod catches in Danish recreational fishing, Survey design and 2013 catches").

## The Baltic Sea and the North Sea and Eastern Arctic

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

For the Baltic Sea, salmon, trout, eel and cod are to be reported and for the North Sea only cod, trout and eel. The recreational fishery in the North Sea is very limited and can be regarded as almost none existing. Denmark has not yet provided a report with the landings estimated for 2013, although all data has been sampled and is in the process of being worked up. The interview survey has only been conducted for 4 years it has not been possible for the WG to use the data directly in assessment. It has however been suggested to include the western Baltic cod data in the WGBFAS in the benchmark in 2016, when a longer time series has been compiled. Presently, the only stock assessed including recreational catches in the ICES system is the Western Baltic cod stock, but here only German recreational catches has been included.

Salmon has not been included in the telephone survey as it was judged that this fishery was not suited for this kind of investigation. The salmon fishery is in a very short time frame and involving few people. An alternative way of receiving more detailed information from the Salmon fishery has to be further developed.

The majority of recreational fishermen in Denmark are occasional anglers using private boats or fishing from piers or using waders along the Danish coasts. A survey conducted by Bohn & Roth (1997) showed that around 13 of all recreational fishermen were members of an association. In Denmark there are several associations for recreational fishermen, with three dominant associations active in advisory committees to the government. These are the Sports Fishermen's Association, the Danish Amateur Fishermen's Association and the Danish Recreational Fishermen's Organization.

| Cod harvest | Period | Central North Sea | | Skagerrak | | Limfjorden | | Kattegat | | The Sound | | Belt Sea | | Arkona Sea | | Eastern Baltic | | | | | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h |
| Fykenets | Jan - Mar | 0.0 | 0 | 0.0 | 0 | 0.2 | 1 | 0.0 | 1 | 0.0 | 0 | 6.9 | 10 | 0.0 | 0 | 0.0 | 0 | | | | | 7.1 | 12 |
| | Apr - Jun | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 1.0 | 12 | 0.0 | 0 | 0.1 | 1 | | | | | 1.1 | 14 |
| | Jul - Sep | 0.0 | 0 | 0.0 | 0 | 1.0 | 8 | 0.7 | 13 | 3.8 | 12 | 5.8 | 43 | 0.1 | 5 | 0.0 | 1 | | | | | 11.4 | 82 |
| | Oct - Dec | 0.0 | 0 | 0.0 | 0 | 0.3 | 5 | 0.5 | 9 | 0.2 | 4 | 8.6 | 31 | 0.1 | 2 | 0.0 | 0 | | | | | 9.8 | 51 |
| | Total | 0.0 | 0 | 0.0 | 0 | 1.5 | 14 | 1.2 | 23 | 4.1 | 17 | 22.4 | 96 | 0.2 | 7 | 0.1 | 2 | | | | | 29.4 | 159 |
| Gillnets | Jan - Mar | 0.1 | 1 | 3.3 | 8 | 1.1 | 2 | 1.7 | 11 | 1.9 | 7 | 9.2 | 31 | 0.5 | 2 | 0.0 | 1 | | | | | 17.7 | 63 |
| | Apr - Jun | 0.1 | 1 | 0.2 | 5 | 0.1 | 1 | 0.6 | 9 | 0.2 | 8 | 5.3 | 47 | 3.1 | 7 | 0.2 | 3 | | | | | 9.8 | 81 |
| | Jul - Sep | 1.6 | 3 | 5.0 | 7 | 1.2 | 0 | 2.1 | 15 | 6.6 | 15 | 16.4 | 61 | 6.0 | 15 | 5.8 | 3 | | | | | 44.8 | 119 |
| | Oct - Dec | 0.0 | 3 | 2.6 | 10 | 0.1 | 3 | 1.3 | 13 | 2.7 | 11 | 16.4 | 50 | 0.5 | 11 | 0.2 | 3 | | | | | 23.8 | 104 |
| | Total | 1.8 | 8 | 11.1 | 30 | 2.5 | 6 | 5.6 | 48 | 11.3 | 41 | 47.3 | 189 | 10.1 | 35 | 6.3 | 10 | | | | | 96.1 | 367 |
| Angling (passive gear license) | Jan - Mar | 3.0 | 9 | 6.4 | 21 | 0.0 | 2 | 4.2 | 14 | 13.2 | 31 | 21.0 | 37 | 3.2 | 11 | 0.1 | 3 | | | | | 51.0 | 128 |
| | Apr - Jun | 12.6 | 8 | 11.4 | 19 | 0.0 | 3 | 1.4 | 7 | 7.2 | 17 | 15.7 | 43 | 1.9 | 8 | 0.4 | 6 | | | | | 50.6 | 111 |
| | Jul - Sep | 10.8 | 12 | 16.3 | 23 | 0.0 | 2 | 3.8 | 12 | 18.2 | 31 | 22.3 | 37 | 3.7 | 11 | 2.1 | 13 | | | | | 77.3 | 141 |
| | Oct - Dec | 2.4 | 4 | 11.3 | 9 | 0.0 | 1 | 1.6 | 5 | 13.1 | 36 | 18.3 | 41 | 1.4 | 8 | 0.3 | 3 | | | | | 48.5 | 107 |
| | Total | 28.9 | 33 | 45.3 | 72 | 0.0 | 8 | 11.0 | 38 | 51.7 | 115 | 77.3 | 158 | 10.2 | 38 | 2.9 | 25 | | | | | 227.3 | 487 |
| Angling (angling license) | Jan - Mar | 29.0 | 14 | 74.1 | 15 | 0.0 | 0 | 6.2 | 10 | 123.2 | 66 | 39.6 | 36 | 14.5 | 7 | 0.0 | 4 | | | | | 286.6 | 152 |
| | Apr - Jun | 59.0 | 14 | 87.3 | 18 | 1.1 | 1 | 7.3 | 15 | 77.6 | 65 | 36.6 | 42 | 57.8 | 11 | 5.0 | 5 | | | | | 331.6 | 171 |
| | Jul-Sep | 33.6 | 10 | 61.5 | 23 | 2.2 | 0 | 27.9 | 16 | 152.2 | 93 | 115.1 | 60 | 11.6 | 14 | 6.8 | 4 | | | | | 410.9 | 220 |
| | Oct - Dec | 6.5 | 4 | 30.2 | 8 | 0.0 | 0 | 9.9 | 11 | 96.1 | 78 | 61.5 | 45 | 4.2 | 8 | 0.4 | 3 | | | | | 208.8 | 157 |
| | Total | 128.0 | 42 | 253.1 | 64 | 3.3 | 1 | 51.2 | 52 | 449.1 | 302 | 252.8 | 183 | 88.3 | 40 | 12.2 | 16 | | | | | 1237.9 | 700 |
| Grand total | Angling | 157.0 | 75 | 298.4 | 136 | 3.3 | 9 | 62.2 | 90 | 500.8 | 417 | 330.1 | 341 | 98.5 | 78 | 15.1 | 41 | | | | | 1465.3 | 1187 |
| | Passive gear | 1.8 | 8 | 11.1 | 30 | 4.0 | 20 | 6.8 | 71 | 15.3 | 58 | 69.7 | 285 | 10.3 | 42 | 6.4 | 12 | | | | | 125.5 | 526 |
| | **Total** | **158.8** | **83** | **309.6** | **166** | **7.3** | **29** | **69.0** | **161** | **516.1** | **475** | **399.8** | **626** | **108.8** | **120** | **21.4** | **53** | | | | | **1590.7** | **1713** |

| Seatrout harvest | Period | Central North Sea | | Skagerrak | | Limfjorden | | Kattegat | | The Sound | | Belt Sea | | Arkona Sea | | Eastern Baltic | | Sweden | | Freshwater | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h |
| Fykenets | Jan - Mar | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 0.0 | 0 | 0.0 | 0 | | | 0 | 0 | 0.0 | 2 |
| | Apr - Jun | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 0.0 | 0 | 0.0 | 0 | | | 0 | 0 | 0.0 | 2 |
| | Jul - Sep | 0.0 | 0 | 0.0 | 1 | 0.1 | 2 | 0.0 | 4 | 0.3 | 1 | 0.6 | 4 | 0.0 | 1 | 0.1 | 0 | | | 0.0359806 | 1 | 1.2 | 14 |
| | Oct - Dec | 0.0 | 0 | 0.0 | 1 | 0.0 | 1 | 0.0 | 2 | 0.0 | 1 | 0.5 | 4 | 0.0 | 0 | 0.0 | 0 | | | 0 | 0 | 0.5 | 9 |
| | Total | 0.0 | 0 | 0.0 | 2 | 0.1 | 3 | 0.0 | 6 | 0.3 | 2 | 1.2 | 12 | 0.0 | 1 | 0.1 | 0 | | | 0.0359806 | | 1.7 | 26 |
| Gillnets | Jan - Mar | 0.0 | 1 | 0.1 | 1 | 0.6 | 4 | 0.8 | 6 | 0.2 | 2 | 4.1 | 13 | 4.2 | 4 | 0.0 | 0 | | | 0 | 0 | 10.0 | 31 |
| | Apr - Jun | 0.2 | 3 | 0.2 | 1 | 1.0 | 6 | 4.6 | 18 | 0.2 | 1 | 3.3 | 21 | 1.5 | 2 | 0.3 | 1 | | | 0.4594155 | 2 | 11.6 | 55 |
| | Jul - Sep | 0.1 | 3 | 1.4 | 7 | 4.4 | 0 | 2.2 | 15 | 1.2 | 15 | 19.2 | 61 | 3.1 | 15 | 1.9 | 3 | | | 0.1199354 | 0 | 33.6 | 119 |
| | Oct - Dec | 0.1 | 3 | 0.6 | 10 | 1.5 | 3 | 2.0 | 13 | 1.5 | 11 | 8.8 | 50 | 0.8 | 11 | 0.1 | 3 | | | 0.0299839 | 0 | 15.4 | 104 |
| | Total | 0.3 | 10 | 2.2 | 19 | 7.4 | 13 | 9.6 | 52 | 3.1 | 29 | 35.4 | 145 | 9.6 | 32 | 2.3 | 7 | | 0 | 0.6093348 | 2 | 70.6 | 309 |
| Angling (passive gear license) | Jan - Mar | 0.0 | 1 | 0.0 | 0 | 0.5 | 3 | 1.3 | 6 | 0.5 | 2 | 11.1 | 19 | 0.8 | 5 | 1.6 | 2 | 0.0 | 3 | 0.0984462 | 4 | 16.0 | 45 |
| | Apr - Jun | 0.0 | 1 | 0.0 | 0 | 0.2 | 3 | 2.5 | 12 | 0.3 | 4 | 7.0 | 35 | 1.1 | 10 | 1.4 | 3 | 0.0 | 2 | 0.1312616 | 2 | 12.6 | 72 |
| | Jul - Sep | 0.4 | 0 | 0.0 | 0 | 2.7 | 6 | 3.3 | 28 | 0.2 | 12 | 7.2 | 48 | 1.0 | 13 | 0.1 | 2 | 0.0 | 2 | 3.4361505 | 17 | 18.3 | 128 |
| | Oct - Dec | 0.0 | 0 | 0.0 | 0 | 0.4 | 3 | 2.3 | 13 | 0.4 | 8 | 4.2 | 34 | 0.5 | 11 | 0.1 | 1 | 0.0 | 1 | 0 | 8 | 7.8 | 79 |
| | Total | 0.4 | 2 | 0.0 | 0 | 3.8 | 15 | 9.4 | 59 | 1.3 | 26 | 29.5 | 136 | 3.4 | 39 | 3.2 | 8 | 0.0 | 8 | 3.6658582 | 31 | 54.7 | 324 |
| Angling (angling license) | Jan - Mar | 0.7 | 2 | 1.4 | 2 | 3.5 | 11 | 16.1 | 33 | 9.7 | 19 | 11.9 | 50 | 5.7 | 18 | 0.3 | 6 | 0.0 | 0 | 1.7658689 | 16 | 51.0 | 157 |
| | Apr - Jun | 0.0 | 2 | 0.5 | 1 | 4.1 | 10 | 22.7 | 58 | 4.8 | 19 | 22.2 | 73 | 3.7 | 19 | 1.4 | 8 | 0.3 | 2 | 1.6259981 | 18 | 61.3 | 210 |
| | Jul-Sep | 0.2 | 4 | 0.0 | 1 | 13.2 | 11 | 20.9 | 69 | 10.8 | 32 | 70.5 | 109 | 8.0 | 37 | 1.5 | 7 | 0.0 | 7 | 7.3210089 | 57 | 132.4 | 334 |
| | Oct - Dec | 0.0 | 0 | 0.0 | 1 | 1.7 | 12 | 9.9 | 45 | 5.7 | 21 | 47.9 | 88 | 6.7 | 28 | 0.4 | 5 | 0.0 | 5 | 2.4561274 | 21 | 74.7 | 226 |
| | Total | 0.9 | 8 | 1.9 | 5 | 22.4 | 44 | 69.6 | 205 | 31.0 | 91 | 152.5 | 320 | 24.0 | 102 | 3.5 | 26 | 0.3 | 14 | 13.169003 | 112 | 319.4 | 927 |
| Grand total | Angling | 1.3 | 10 | 1.9 | 5 | 26.2 | 59 | 78.9 | 264 | 32.3 | 117 | 182.1 | 456 | 27.4 | 141 | 6.8 | 34 | 0.3 | 22 | 16.834862 | 143 | 374.1 | 1251 |
| | Passive gear | 0.3 | 10 | 2.2 | 21 | 7.5 | 16 | 9.6 | 58 | 3.5 | 31 | 36.6 | 157 | 9.6 | 33 | 2.4 | 7 | 0.0 | 0 | 0.6453154 | 3 | 72.4 | 336 |
| | **Total** | **1.7** | **20** | **4.2** | **26** | **33.8** | **75** | **88.5** | **322** | **35.8** | **148** | **218.7** | **613** | **37.0** | **174** | **9.1** | **41** | **0.3** | **22** | 17.480177 | 146 | **446.5** | **1587** |

| Eel harvest | Period | Central North Sea | | Skagerrak | | Limfjorden | | Kattegat | | The Sound | | Belt Sea | | Arkona Sea | | Eastern Baltic | | Sweden | | Freshwater | | TOTAL | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h | y | h |
| Fykenets | Jan - Mar | 0.0 | 0 | 0.0 | 0 | 0.1 | 2 | 0.1 | 3 | 0.7 | 2 | 0.5 | 8 | 0.0 | 1 | 0.0 | 0 | | | 0.0 | 0 | 1.4 | 16 |
| | Apr - Jun | 0.0 | 2 | 0.0 | 0 | 0.6 | 7 | 0.5 | 9 | 0.2 | 3 | 1.0 | 20 | 0.0 | 3 | 0.1 | 2 | | | 0.0 | 2 | 2.4 | 48 |
| | Jul - Sep | 0.2 | 11 | 0.0 | 2 | 10.9 | 50 | 4.5 | 44 | 1.7 | 24 | 12.5 | 89 | 1.5 | 21 | 2.4 | 3 | | | 0.4 | 12 | 34.0 | 256 |
| | Oct - Dec | 0.0 | 1 | 0.0 | 0 | 1.7 | 14 | 0.8 | 23 | 0.3 | 13 | 8.0 | 53 | 0.5 | 7 | 0.8 | 2 | | | 0 | 4 | 12.2 | 117 |
| | **Total** | **0.2** | **14** | **0.0** | **2** | **13.3** | **73** | **5.8** | **79** | **2.9** | **42** | **22.0** | **170** | **2.0** | **32** | **3.3** | **7** | | | **0.4** | **18** | **49.9** | **437** |

Table 1. Landings in the Danish recreational fishery by area and quarter of cod, sea trout and eels.

**Salmon in the Baltic**

**Salmon in the Baltic**

The Danish recreational fishery for salmon is increasing in popularity, as catches have been increasing in recent years and the activity is further promoted by popular fishing contests. It is especially popular around the island Bornholm, but fishing also takes place further to the west in the Baltic Sea. The recreational fishery is primarily carried out by trolling from small boats and vessels. Some small harbors on the north and east of the island of Bornholm have specialized on servicing the trolling fishery.

The fishing season starts in September and ends in May. Both Danish nationals and visitors from abroad attend the fishery, either for regular private fishing trips or as participants in angling competitions. In addition to trolling, a traditional subsistence fishery is carried out by local non-professional inhabitants on the island Bornholm, setting with only a few hooks part of the year around the island Bornholm.

In the North Sea there is no recreational fishery for salmon.

Trolling: The official number of salmon caught by the sport fishery (trolling boats) is was 3000 in 2013. This information is based on data collected from 2 larger trolling fishing competitions in the spring period and information on effort in the western part of the Baltic. A 3.rd competition covering the rest of the fishing season was not running in 2011. A large part of the total catches taken by the Danish trolling fishermen are registered in the 3 competitions.

Subsistence long-lining made by non-professionals: The catches are quite uncertain as no catches are reported at all. Our guestimate is that the total catches in this fishery is around per year, which is less than previously estimated. The reason for the reduction in estimated catch numbers is a recent heavy increase in the population of grey seals in the area .

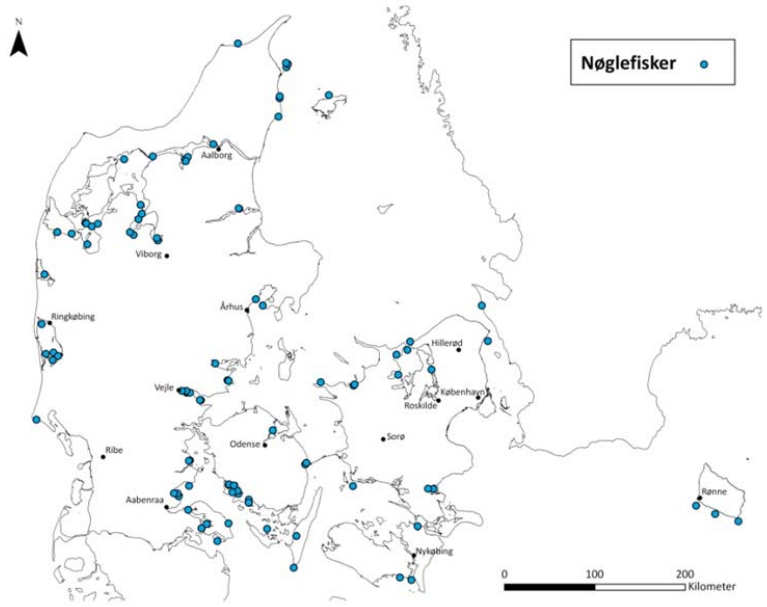



Fig.1. Maps showing distribution of fishermen during 2012. A total of 91 fishermen participated, 76 with gillenet and 68 with trap-net.

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

The result from the 2 interview surveys has only been included in this report as preliminary data as the final version will be worked up during the next couples of month. However all data have been for 2013 has been collected at present time. In most European member states information on harvest taken in the recreational fishing is gathered using some kind of interview-based recall survey. A recall survey is a type of off-site survey which relies on collecting information through mail, telephone or internet interviews. Respondents are asked to recall e.g. their catches, number of fish caught and released, fishing pattern and/or number of days fished. The specific timeframe respondents are asked to recall within should be kept as short as possible since the longer the timeframe, the more the estimate tends to be biased towards overestimation. Also in Denmark an interview-based approached was chosen. Statistic Denmark and DTU Aqua developed a concept for a combined telephone and internet recall survey in September 2009. However, in 2010 this design was improved by conducting two phases thereby limiting the recall period to a maximum of 6 months. Further, the surveys covering since the 2010 catches did also include the harvest of seatrout and the number of fish released. Relying on respondent ability to remember catches or effort within a specific time period are followed by a number of biases such as digit preference, telescoping, non-responding bias and rule-based estimation. Digit preference means that the respondent will have a tendency for rounding figures to 0 or 5, a tendency that will increase with increasing recalling period. In this study we did see a tendency for some digit preference especially when reporting the catch in weight but whether this would increase or decrease the total estimated harvest is difficult to decide. Telescoping is the tendency for respondents to report an event, such as the catch of a trophy fish, even though it

actually happened outside the time frame asked. This could potential mean an overestimation, especially in the angling harvest of cod, where some trophy fishing takes place. The bias introduced by non-respondents emerges since those fishers with the lowest participation rate will have the highest non-responding rate, but since the non-respondent rate in present survey was very low this is not likely to have caused any major bias. Another potential source of bias is the risk that a rule is applied by the respondent when trying to remember the catches during the last 6 or 12 month. Typically, an average catch per trip is memorized and then multiplied with the assumed number of trips. This can potentially lead to a severe overestimation of the harvest, because there is a general tendency for exaggerating the participation rates in recreational events, there among fishing. This could impose a large overestimation in present study, especially for the passive gear fishing where it seems likely that some applies a rule, such as multiplying on average catch per gillnet or fykenet with the recalled number of days fished. With the purpose to increase precision in these surveys, Denmark is presently developing a target group that should report back on the biological information by area and quarter. This would increase the quality of the reported weight values that we are receiving in the interview survey.

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

No recommendation from 2013 relevant to Denmark.

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

Since 2009 Denmark has initiated a survey and sampling on the recreational fishery and it has been conducted twice a year since then. In 2010 the survey was expanded to sea trout. However, the same level of knowledge has not been achieved for Salmon and a proper way to sample this fishery has to be developed.

### III.E Biological - stock-related variables

To get catch-in-numbers (CANUM) and weight-in-catch (WECA) by age group, sampling of the landings and discards is undertaken. For pelagic stocks simple random sampling is undertaken in land. Here a unsorted sample is taken by the control sent to DTU-Aqua and analysed at the institute. This sampling strategy is the case for sprat, sandell, herring, boarfish, and Norway pout. For sand-ell, sprat and Norway pout the sampling is supplemented by a self-sampling program sampling haul by haul For all species landed by sorting groups another strategy is applied; a fixed number of individuals are sampled randomly within market size category (if sorted) /unit (unit =area, quarter and gear). All individuals in a sample are analyzed according to length, weight and age. Sampling strategy on surveys and onboard fishing vessels differs from market sampling and was performed as follows: all individuals (or a sub sample) were length measured by species and a fixed number per length class was sampled for age and weight. For stocks sampled on surveys and onboard fishing vessels, the length can be given an age by using an Age-Length-Key. Maturity data is only estimated on scientific surveys to achieve a higher expertise, the correct time of year and to be able to get non gutted fish.

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These were followed and the actual sampled number is therefore dependent on the amount of catch.

## The Baltic Sea (ICES areas IIIb-d)

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

All stocks sampled during 2013 for biological variables, age, length, weight, sex and sexual maturity are listed in table III.E.3. The variables are collected from different sources like survey, market or sea sampling and sampling strategy differs. For most stocks the sampling sources are listed and the results presented in separate rows. In table III.E.3 in the NP most consume species have listed survey and harbour sampling as data sources however for most of the consume species sea sampling should also have been listed as data source. ICES has in 2012 increased the focus on flatfish species in the Baltic and a benchmark was conducted on these species in 2013 and for this reason 2 more species have been sampled although not planned for in the NP (dab and flounders).

***Cod in sub. 22-24 and 25-32***

Cod in the western Baltic (22-24) has been slightly oversampled for all parameters but is very close to the planned values (between 115-123%). For the Eastern Baltic, there has been a slightly lower sampling level, for weight, length and age 85% of the planned level, however this is due to the lower catch level where in 2013 only 46% of the Eastern Baltic cod TAC were taken.

***Sole in sub. 22-24***

In 2013 sole were oversampled at 189% for sex and maturity. For weight and age 205 specimens were sampled of 300 planned in the NP or 68%.

***Herring in sub. 22-32***

Herring was over sampled at 156% in the western Baltic 22-24. It was planned to sample 2000 specimen and 3111 were actually sampled. There has been a statement from the herring working group that they would like more Danish samples and this we have tried to accomplice. For maturity and sex the species was oversampled between 199%- 402%. In the eastern Baltic 25-32 herring was on the other hand under sampled with 48%-61% of the applied level in the NP. The reason is the decrease in effort in the east Baltic water were the effort in the metier targeting herring (PTM_SPF_16-104) has decreased to 38% of the effort level in the reference year.

***Sprat in sub. 22-32***

Sprat was sampled very close to the planned level with 97% of the weights and age and a bit less for the sex and maturity. Again all sex and maturity data are from surveys.

***Dab in sub. 22-24***

Dab is sampled at the planned level for weight and age and under-sampled for sex and maturity (38%) this is because data is only sampled on 1 quarter survey and here all specimen are sampled.

***Flounder in sub. 22-24***
1686 flounders have been length, weighted and aged in 2013 and 2000 were planned – and for sex and maturity 947 and 673 were sampled, a bit more than the 500 planned for. However, ICES was conducting an benchmark assessment in 2014 for this species and therefore an extra effort has been put into sampling. Samples on sex and maturity are conducted at surveys and the guidelines from WGBIFS are followed.

***Plaice in sub 22-32***
The sampling level for plaice were between 196% - 236 % for age and maturity respectively. As for the flounders the oversampling is partly due to the benchmark in 2014 for the flatfishes in the Baltic. Samples on sex and maturity are conducted at surveys and the guidelines from WGBIFS are followed.

***Turbot and brill 22-32***
Turbot and brill have by a mistake not been planned for in the NP in 2012 and 2013.. For turbot 246 length, weight and age samples have been conducted and 91 sex and maturity samples. 124 brill were aged, length and weight measured and 53 were sexed and maturity measured.

***Salmon in sub. 22-31***
Salmon was sampled at 172% of the level planned in the NP. The increased sampling level is caused by an increased effort in sampling the long liner fishery in the Baltic.

Eel in ***sub. 22-32***

Denmark has not aged eels the last 2 years as the result from age readings are not considered very reliable and before an international agreed method is developed on this stock  it is a waste of resources to age eels. Furthermore, age readings are not used in the present stock assessment. However Denmark has length measured 1812 eels 20% more than the applied level in the NP.

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

All precision estimates have to be achieved at a regional, but there is still missing some coordination work between countries, so all the CV's represented in table III.E.3 are estimated at a national level.

Denmark has used the method described in Appendix 1 to calculate the CV's for age and weight for the species in table III.E.3. CV's for maturity and Sex have not been calculated, since the data only are used at a regional level and therefore it makes no sense to calculate the CV's at a national level.

The CV's for age and weight are based solely on data from harbour samplings. The precisions obtained for age and weight are considerable high than in previous years, since previous all data obtained for a species regarding data source and sampling strategy were used to calculate the CV.

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

No recommendation from 2013 relevant to Denmark.

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

Compared to last year nearly all under sampled stocks are now sampled at the correct at a higher level. It is still challenging to archive the correct level for sex and maturity. This is partly due to the fact that maturity is only measured at surveys (and often only in the 1st quarter survey – spawning time) and it can be challenging to plan exactly how many fish are caught during the survey.

Denmark has according to the guidelines outlined in the WGPICS1-3, SGPIDS1-3 and PGCCDBS developed and improved our sampling strategy in the national programs to be a random statistical sound sampling. This indicate that all vessels selected for commercial sampling are selected in a random way and that the responses are registered. For our harbour sampling program the statistically random sampling program have first been developed recently. As have been highlighted in the comments, the Danish sole survey (not funded by the DCF) were terminated in 2011. As the landings of this stock is very low (between 740 and 750 t) it can been very difficult to haunt the few species landed. However, to improve the sampling of sole, it has been decided to change the sampling procedure for this stock not to be sampled in the harbour anymore but to buy the sole from the observer trips (every trip) to be able to increase the numbers of sole sampled (and still keep the statistical random sampling scheme). The disadvantages with such a system is off course you do not sample the fleets were no observer trips are conducted. However it was considered to be the only solution when a very low number of fish is landed.

## The North Sea and Eastern Arctic (ICES areas IIIa, IV and VIId)

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

All stocks sampled during 2013 for biological variables, age, length, weight, sex and sexual maturity are listed in table III.E.3. The variables are collected from different sources like survey, market or sea sampling and sampling strategy differs. For most stocks the sampling sources are listed and the results presented in separate rows.

In the North Sea following species were not sampled as stated in the NP:

***Thorny skate and Tope Sharke, Common skate, spotted ray and Cuckoo ray in sub. IV and IIIa***

None of the shark or ray species have been planned for in the NP as they are not commercial species, however the species have been analysed and recorded on surveys for sex and maturity. Here 169 thorny skate were reported in IIIa and 250 in sub. IV. Only 3 tope sharks have been caught in survey and measured and sexed. For the Cuckoo ray 8 specimen, 35 spotted ray and 2 common skate have been sex and weighted in IV in 2013.

***Sandeel in sub. IV and IIIa***

Sandell weight, age and length have been sampled at 129% and 195% in the North Sea and IIIa, respectively. Maturity at age has been oversampled by 133 % in the North Sea and 159% in IIIa. This data are available from the November sandeel survey in the North Sea, a little lesser are sexed as the very small specimen can be difficult to sex although the can be matured. .

***Herring in sub. IIIa, IV-VIId and I-II***

Herring was in the Norwegian Sea (I and II) under sampled with 62% or 372 specimen were also effort has decreased to 48% of the level in the reference year, however in all other areas herring were oversampled between 128-202% for all parameters (2555 and 4040 specimens)

***Cod in IIIaN, IIIaS, IV- VIId***

Cod has been sampled slightly above the planned level for weight@age, length@age and sex@age in IV-VIID with 101%. In IIIaN and S were slightly under sampled at 87% and 84% respectively of the planned level was achieved, however this is still 3495 and 2088 specimen. However for sex@age and maturity@age there was an under sampling in the IIIaS and IIIaN as the Danish cod survey has been terminated in 2012 and this has resulted in an under sampling for sex and maturity. This area is however covered by the Swedish IBTS.

***Anglerfish in sub. IV- VIId***

308% of the planned sample level for weight@age or length@age were collected, it is however still at a relatively low level 308 individuals. Maturity and sex data is only collected in the 1 quarter survey (IBTS) in the North Sea and is therefore very depended on the amount of fish caught in the survey and only 5 specimen were caught and matured here.

***Whiting in sub. IV- VIId and IIIa***

Sampling was slightly oversampled for all parameters (between 116 – 268% of the planned level).

***Haddock IV and IIIa***

In the national program maturity and sex was not planned for in IV (but weight and age) and opposite in IIIa were sex and maturity were planned for but not weight and age. This is off course a mistake and all parameters in both waters have been sampled. In both area close to the planned 1500 specimen (or 95% and 99% for the North Sea and IIIa, respectively). In the North sea the maturity and sex were sampled with 229% and 539% of the planned level. However in IIIa only 22% of the planned levels were collected.

***Plaice in IIIa and IV***

Age were in both areas slightly undersampled in IIIa sampled at 72% - 2529 individuals and in IV with 78% corresponding to 3922 individuals) Maturity and sex were slightly oversampled for both stocks.

***Dab in IIIa and IV***

Dab was not planned for in IIIa but in the North Sea. However, in 2013 the landings of dab were larger in III than in the North Sea and therefore dab from this area were collected although not planned for. 1614 specimen were weighted and aged in total (200 were planned for) but only 56 and 30, respectively were sexed and matured.

***Turbot in IIIa and IV***

Sampling of turbot  was only planned for in IV and not in IIIa in the NP – this is incorrect and the species has been sampled for all parameters in both areas.

***Brill in IIIa***

Sampling of brill was not planned for in IIIa in the NP – this is incorrect and the species has been sampled for all parameters in the area.

***Sole in IIIa and IV***

Sampling of sole  was only planned for in IIIa and not in IV n the NP – this is incorrect and the species has been sampled for all parameters in both areas. There has been a higher sampling intensity in IIIa than in IV. However the earlier high level of sampling ( and the applied level in the NP) has not been reached as both quota and the survey has been downscaled since 2012. Before 2012 the main part of the biological information came from the sole survey now terminated. Denmark has planned to conduct the survey every second year in the future.

***Lemon Sole in IV***

Lemon Sole were for maturity and sex sampled at the applied level, but slightly undersampled for weight and age (62%). However the landings of Lemon sole has decreased compared to previous years and is in 2013 only 65% of the landings in 2011 and 2012.

*Norway pout in IV and IIIa*

Norway pout was sampled slightly above the applied level for age, weight and sex, but only half of the applied sampled were matured. We only mature the round fish in the 1 quarter survey, why the level between maturity and sex can differ.

***Saithe in IV, IIIa, VI***

Length@age and weight@age data were sampled at 164% of the applied, very little sex or maturity data were obtained as this is only conducted on the IBTS 1 quarter and few saithe (58 individuals) were caught.

***Hake in IIIa, IV, VI and VIIab***

The achievement of collected maturity data was 192%, however the amount is still very low 96 speicmen. Length, age and weight were collected from 138% (1376) of the planned samples.

***Mackerel in North Sea***

In 2013 Denmark managed to sample close to the planned level 109 % (2753 individuals) for weight, length and age. For maturity and sex-ratio and extra effort was enforced in 2012 and 2013 (as the level last year was very low) and this increase sampling level and the mackerel is oversampled compared to the planned level for all parameters in 2013.

***Sprat in IV and IIIa***

Sprat was sampled at 18% of the planned level in sub IIIa and 122% in sub IV. The lower level in IIIa is due to the significant decrease in catches in the pelagic fishery in this area in 2013 as the by-catch percentage of herring is to large in the fishery. Maturity and sex@age was close to the planned level in IV and below in area IIIa

***Witch flounder in IV and IIIa***

Witch flounder were sampled at the planned level for weight and age but below the planned level for sex and maturity, as this is sampled at the 1 quarter survey the amount of specimen caught is difficult to predict beforehand. In sd IV only sampling on sex and maturity was planned for in the NP for 2013, but not weight and age. This is off course a mistake and 444 specimen or nearly the same level as in IIIa were sampled.

***Ling IIIaN and IV***

Ling is a new species to be sampled by Demark and is only sampled in very small quantities in 2013, 232 individuals however above the planned level (232%) . No ling was caught in the survey and therefore no maturity or sex at age data has been sampled.

***Deep water shrimp IV, IIIa***

Shrimps are caught in Skagerrak and sometimes in the border to the North Sea. The species were sampled for sex, length and weight (however not for age) and was oversampled for these parameters around 129%. For one of the parameters it was stated the planned sampling level should be 400 as all shrimps that are weighted and length measured are also sexed, the correct value is 4000 this will be corrected in the updated version of the NP.

***Nephrops in IIIa and IV***

Length, weight, maturity and sex are sampled in very large numbers for this species. Samples are mainly deriving from the Nephrops survey and from discard trips. As Nephrophs cannot be aged all samples are by length.

***Brown shrimp in IV***

Cragon was oversampled with 158% and 203% for sex and weight respectively but some lesser for maturity 41% corresponding to 1581, 6077 and 412 individuals.

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

A coordination scheme has been set up at the RCM North Sea to improve and ease the task sharing of age reading. This will be of great help as every country do not have to work up the expertise for age readings in all species but can set up a bilateral agreement with the MS with the best expertise, as the numbers of species to be read has increased in later years.

All precision estimates have to be achieved at a regional, but there is still missing some coordination work between countries, so all the CV's represented in table III.E.3 are estimated at a national level.

Denmark has used the method described in Appendix 1 to calculate the CV's for age and weight for the species in table III.E.3. CV's for maturity and Sex have not been calculated, since the data only are used at a regional level and therefore it makes no sense to calculate the CV's at a national level.

The CV's for age and weight are based solely on data from harbour samplings. The precisions obtained for age and weight are considerable high than in previous years, since previous all data obtained for a species regarding data source and sampling strategy were used to calculate the CV.

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

No recommendation from 2013 relevant to Denmark.

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

See section III.E.4. Baltic

## The North Atlantic (ICES areas V-XIV and NAFO areas)

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

Only 109 tonnes of bluewhiting have been landed from fisheries in this area by Denmark. It should also be mentioned very few fishing trip in that area have been made.

In the North Atlantic following species were not sampled as stated in the NP:

***Blue whiting***

Denmark has 15% of the EU quota of bluewhiting in the North Atlantic. the TAC increased in 2013. Therefore Denmark oversampled this species by 240% however still only 680 individuals.

***Boar fish***

Denmark initiated a fishery on a new species the Boarfish in the North Atlantic. This species has been sampled very intensely since 2010 although not planned according to the NP. However, as the species is new DTU Aqua estimated that it would be of great value to get increased knowledge.

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

All precision estimates have to be achieved at a regional, but there is still missing some coordination work between countries, so all the CV's represented in table III.E.3 are estimated at a national level.

Denmark has used the method described in Appendix 1 to calculate the CV's for age and weight for the species in table III.E.3. CV's for maturity and Sex have not been calculated, since the data only are used at a regional level and therefore it makes no sense to calculate the CV's at a national level.

The CV's for age and weight are based solely on data from harbour samplings. The precisions obtained for age and weight are considerable high than in previous years, since previous all data obtained for a species regarding data source and sampling strategy were used to calculate the CV.

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

None of the recommendations are relevant to Denmark, as Denmark has only had a fishery for boar fish and blue whiting.

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

None.

## III.F Transversal variables

### III.F.1 Capacity

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

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

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

As the information in the Vessels Register is registered according to Regulation (EC) N$^{o}$ 2930/1986, N$^{o}$ 2090/1998 and N$^{o}$ 26/2004 and is updated daily data on fishing capacity is assumed to be correct

Therefore, no deviations exist in relation to what was stated in the national programme.

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

No action is needed.

### III.F.2 Effort

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

If a vessel less than 10 m (or less than 8 m in the Baltic) is having at least one sales note at a calendar day, a fishing day is assumed and counted as one fishing day.

According to the Danish NP the following derogations have been asked:

‘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

As the Danish NP has been approved the above derogation has been granted.

Therefore, no deviations in relation to what was stated in the national programme exist.

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

All logbook data is recorded in accordance with the provisions in the Control Regulation (Commission Regulation (EC) N$^{o}$ 404/2011). Even though effort from the national authorities is put into the improvement of the fishers logbook recordings errors might occur. The obligation to use e-logbook for all vessels above 12 meter in length will most likely improve the quality of the data. Still improvements can be made, but this needs a revision of the Control Regulation (Commission Regulation (EC) N$^{o}$ 404/2011).

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

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

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

According to the Danish NP no shortfalls have occurred.

### III.F.3 Landings

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

In Denmark first hand fish buyer has to report to the authorities the amount of fish in kilo and value, the size grade, the quality, the area of origin, from whom the fish is bought from as well as other information. The volume of fish landed in Denmark has always been recorded using sales slips as sales slips information is 100% accurate. Logbook data is only used to determine which métier and statistical rectangle the amount in weight and value according to the individual sales slip should be related to. There have been no deviations in relation to what was stated in the national programme.

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

All fish landed in Denmark is recorded, therefore census data. No deviations in relation to what was stated in the national programme exist.

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

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

#### *III.F3.4 Actions to avoid shortfalls*

As no shortfalls have happened no actions have to be made.

## III G Research surveys at sea

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

In table III.G.1 an overview is given of the planned and achieved numbers of days at sea and the number of fishing hauls, transect length with acoustic data integration (Echo NM) etc.

The biological data from surveys are stored in the national biological database “Babelfisk”. The acoustic data are stored in a national acoustic database. MIK data are stored in a national MIK database. CTD and other hydrographical information are stored in a national CTD database for later submission to ICES.

The BITS and IBTS survey data have been submitted to ICES and are stored in the ICES DATRAS database.

**Baltic International Trawl Survey (BITS)**

The survey is carried out in both the first and fourth quarters with participation of the research vessel R/V DANA and the smaller research vessel R/V HAVFISKEN. The primary purpose of the part undertaken by R/V DANA is to estimate abundance indices for recruitment and stock abundance of the Baltic cod stocks. The second part undertaken by R/V HAVFISKEN provides in addition to cod also abundance indices for flatfish. The BITS survey is coordinated by the ICES Baltic International Fish Survey Working Group.

Types of data collected:

- Species composition
- Length and age measurements
- Samples of cod for estimating age composition, sex ratios, maturity and growth parameters
- CTD: temperature, salinity and dissolved oxygen content

Achievements in 2013:

In the summary table below the planned and achieved days at sea and fish hauls on R/V DANA and on R/V HAVFISKEN are listed (Number of stations not fished due to bottom oxygen < 1.5 ml/l given in brackets).

| Survey | Vessel | Planned days at sea | Achieved days at sea | Planned fish hauls | Achieved fish hauls |
|---|---|---|---|---|---|
| BITS 1st quarter | Dana | 18 | 18 | 51 | 45 (0) |
| BITS 1st quarter (KASU I) | Havfisken | 20 | 18 | 49 | 48 |
| BITS 4th quarter | Dana | 18 | 18 | 51 | 50 (16) |
| BITS 4th quarter (KASU II) | Havfisken | 20 | 20 | 49 | 47 |

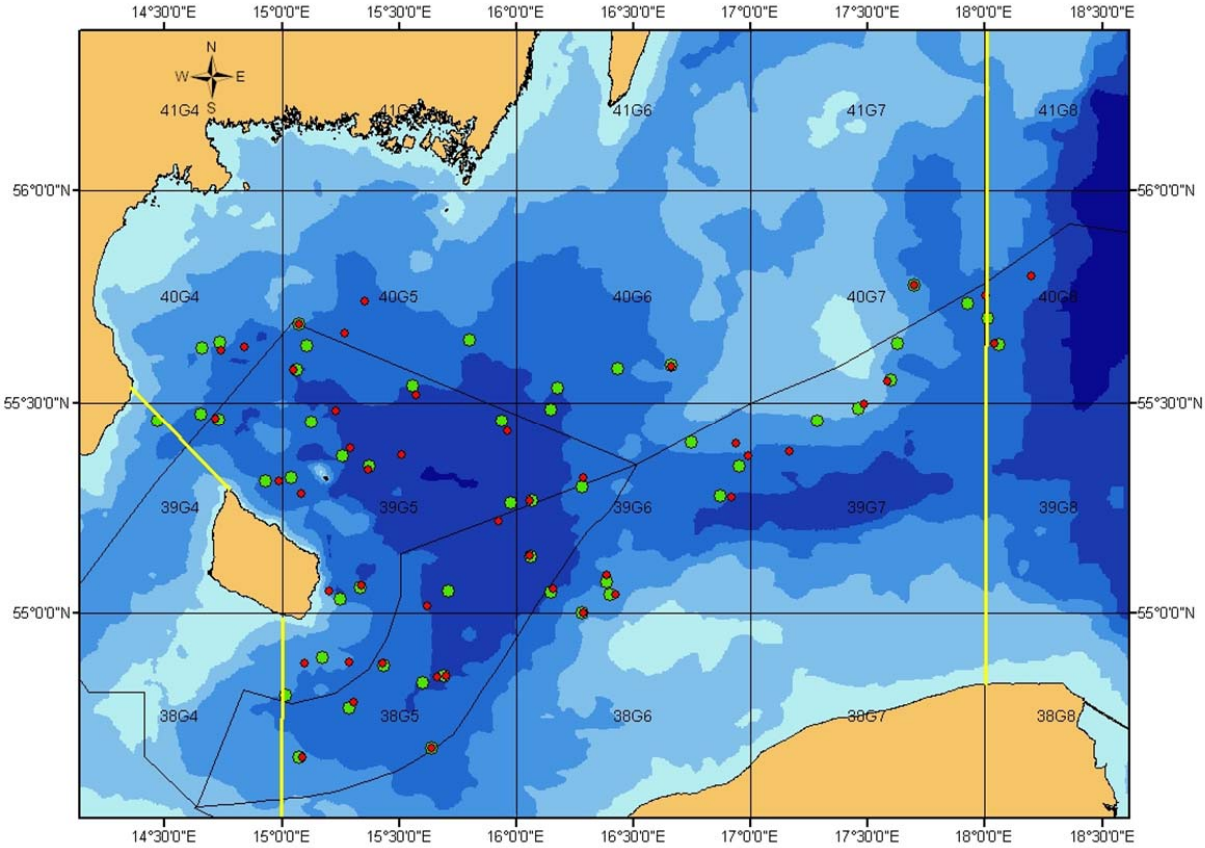



**Figure III.G.1 Map showing BITS 1st quarter 2013 RV Dana bottom trawl and CTD positions (red dots: conducted, green dots: planned).**

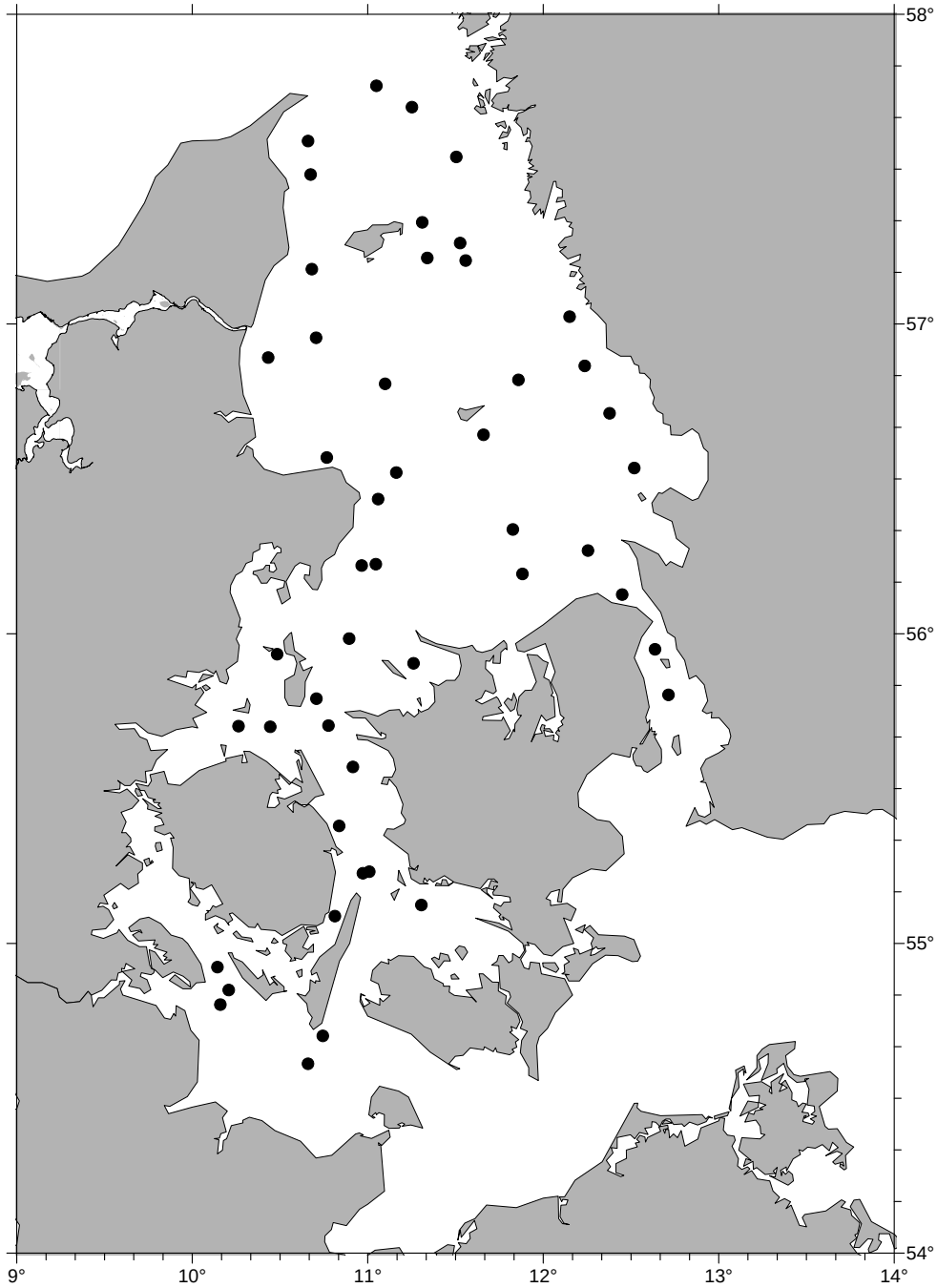



**Figure III.G.2 Map showing BITS 1st quarter 2013 RV Havfisken sampling positions (Bottom trawl and CTD).**

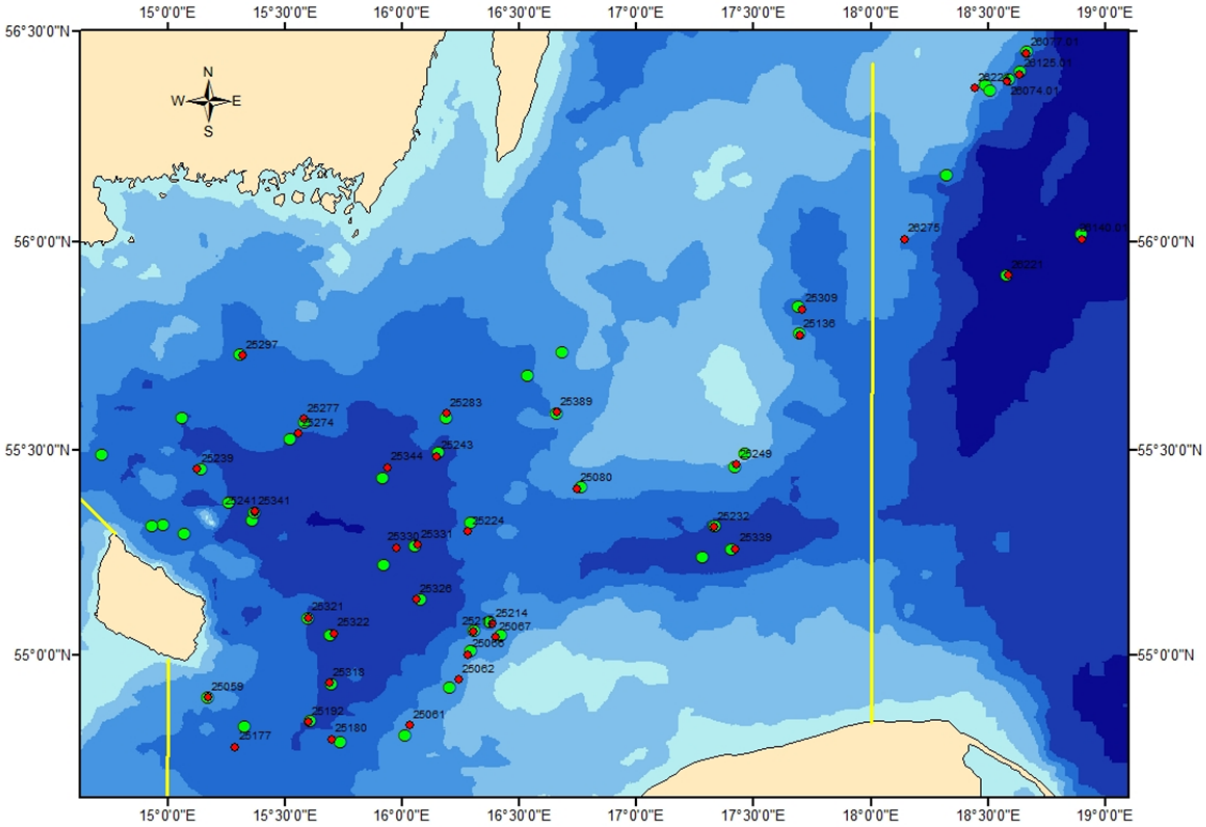



**Figure III.G.3 Map showing BITS 4th quarter 2013 RV Dana bottom trawl and CTD positions (green dots: conducted, red dots: planned).**

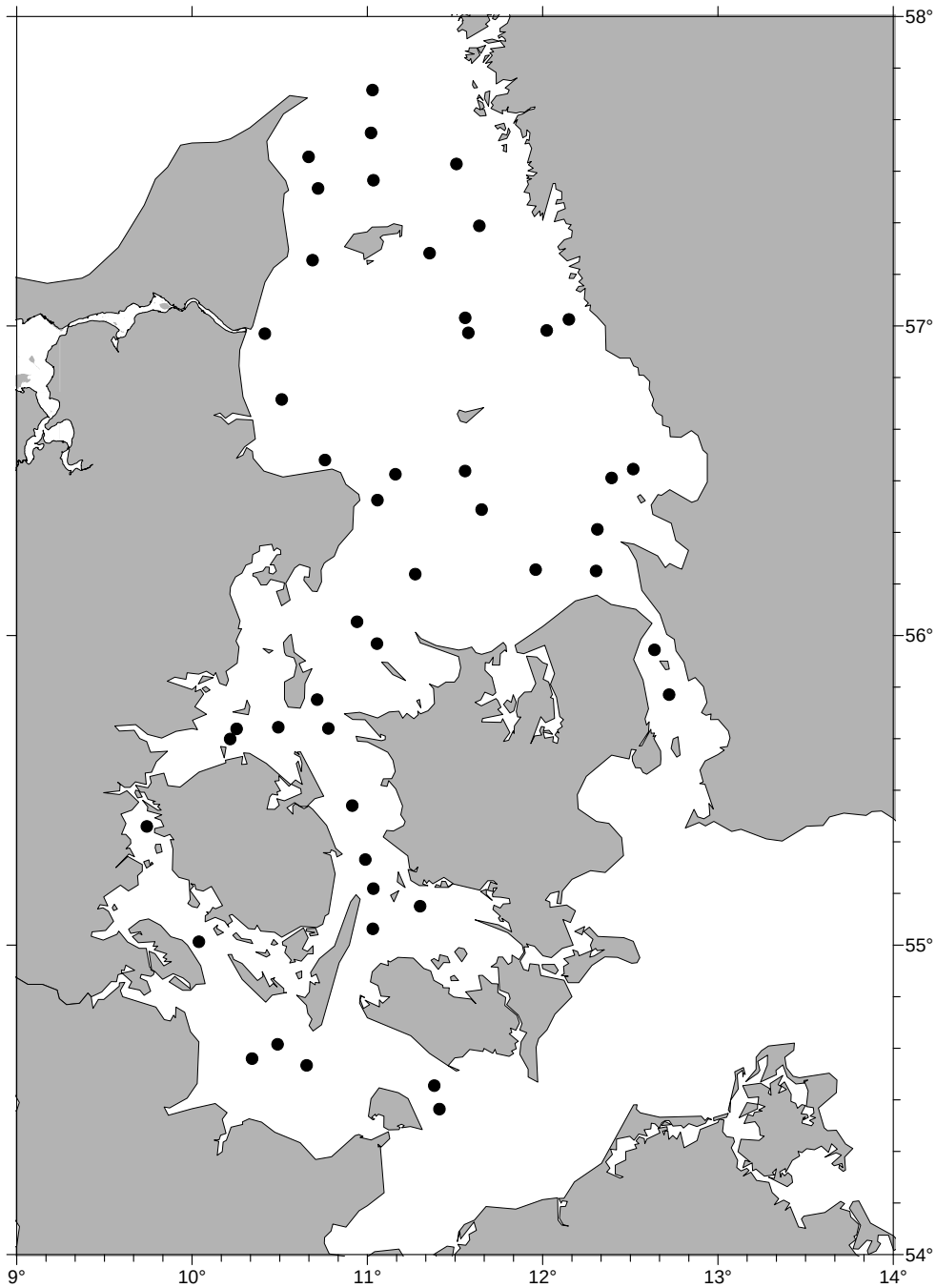



**Figure III.G.4 Map showing BITS 4th quarter 2013 RV Havfisken sampling positions (Bottom trawl and CTD).**

**International Bottom Trawl Survey (IBTS)**

The purpose of the survey is to estimate abundance of commercial (cod, haddock, whiting, Norway pout, saithe, herring, sprat, and mackerel) and non-commercial fish species by means of bottom trawling and to collect otoliths of commercial species to assess abundance by age, in particular for the recruiting year classes in the North Sea, Skagerrak and Kattegat. It is a trawl survey using GOV-trawl. The IBTS survey is coordinated by the ICES International Bottom Trawl Survey Working Group.

Types of data collected:

- Species composition
- Length and age measurements
- MIK: plankton, fish larvae (only first quarter)
- CTD: temperature and salinity at fishing stations

RV Dana covered the area allocated to Denmark by the coordinator as planned in the 1st and 3rd quarter 2013 (Figs. III.G.5 and III.G.6).

Achievements in 2013 (number of days at sea and number of valid stations):

| Survey | Vessel | Planned days at sea | Achieved days at sea | Planned fish hauls | Achieved fish hauls |
|---|---|---|---|---|---|
| IBTS 1st quarter | Dana | 18 | 18 | 40 | 39 |
| IBTS 3rd quarter | Dana | 18 | 17 | 50 | 50 |

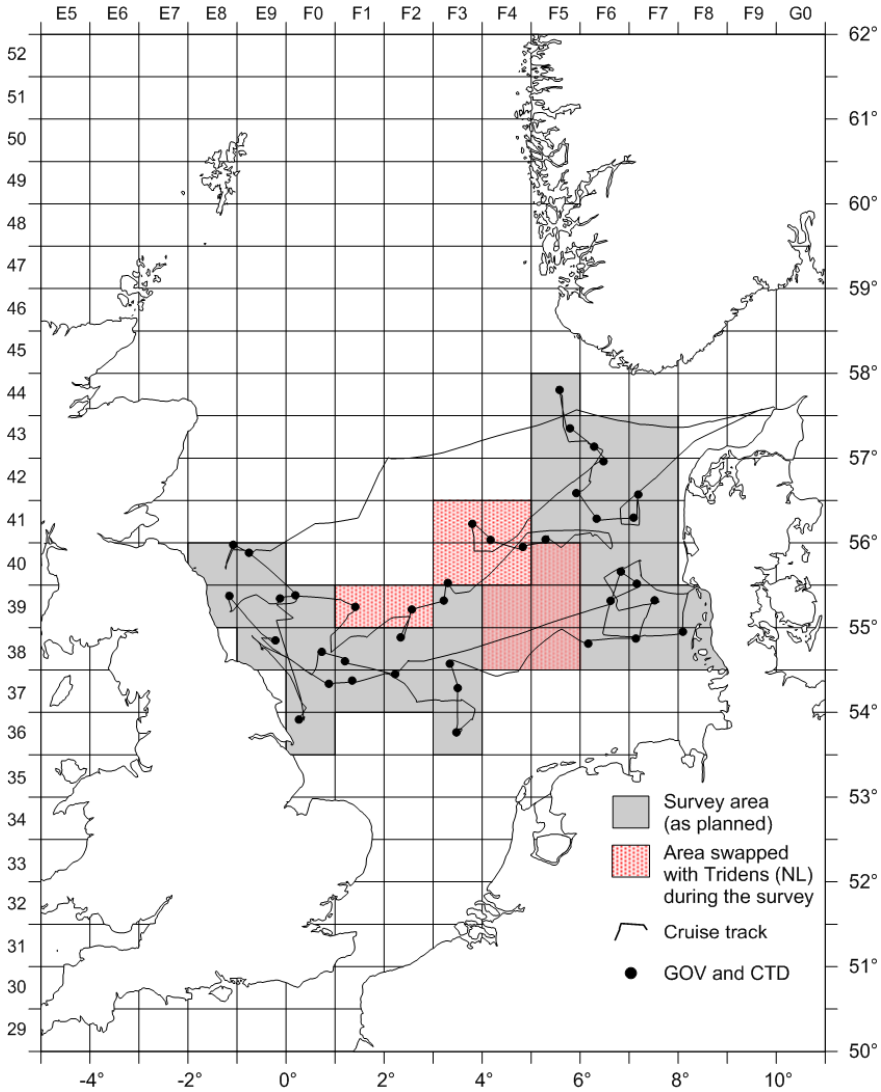



**Figure III.G.5 Map showing IBTS 1st quarter 2013 RV Dana survey area, cruise track GOV haul and CTD positions.**

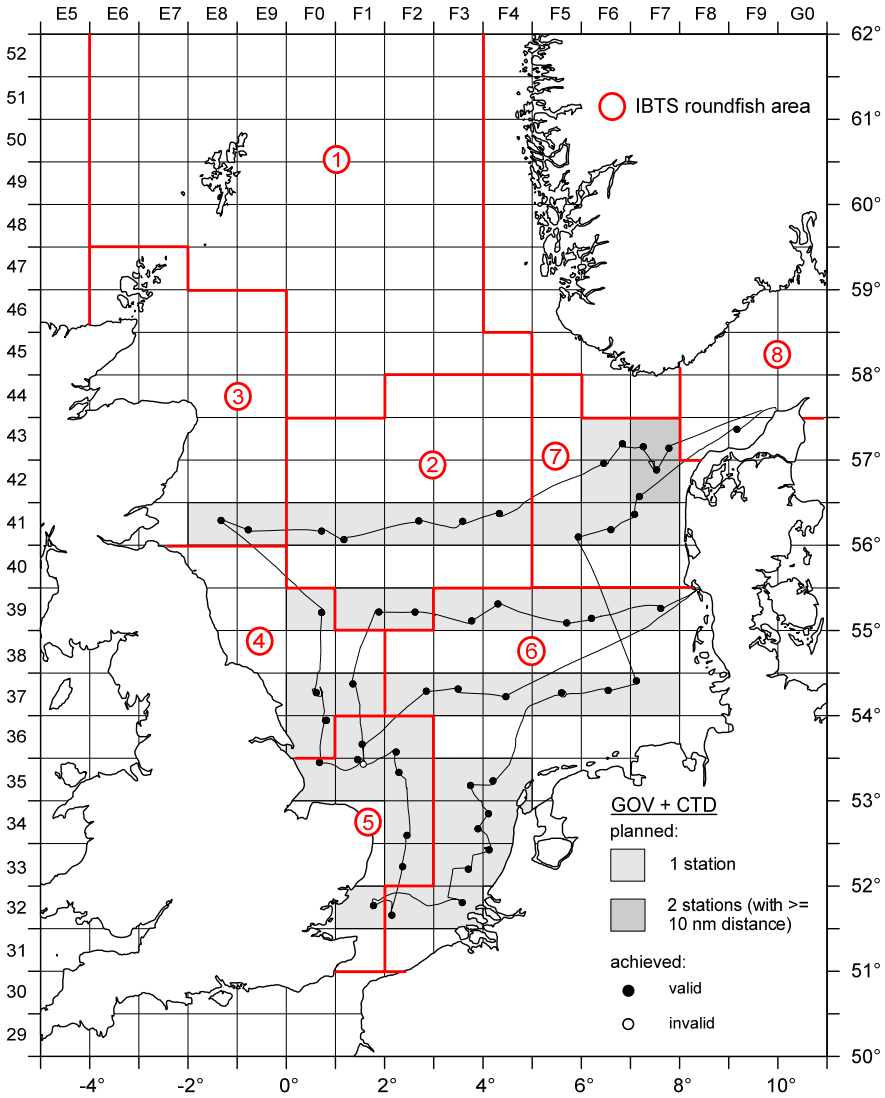



**Figure III.G.6 Map showing IBTS 3rd quarter 2013 RV Dana survey area, cruise track, GOV haul and CTD positions.**

**International Ecosystem Survey in the Nordic Seas (IESNS, previously ASH)**

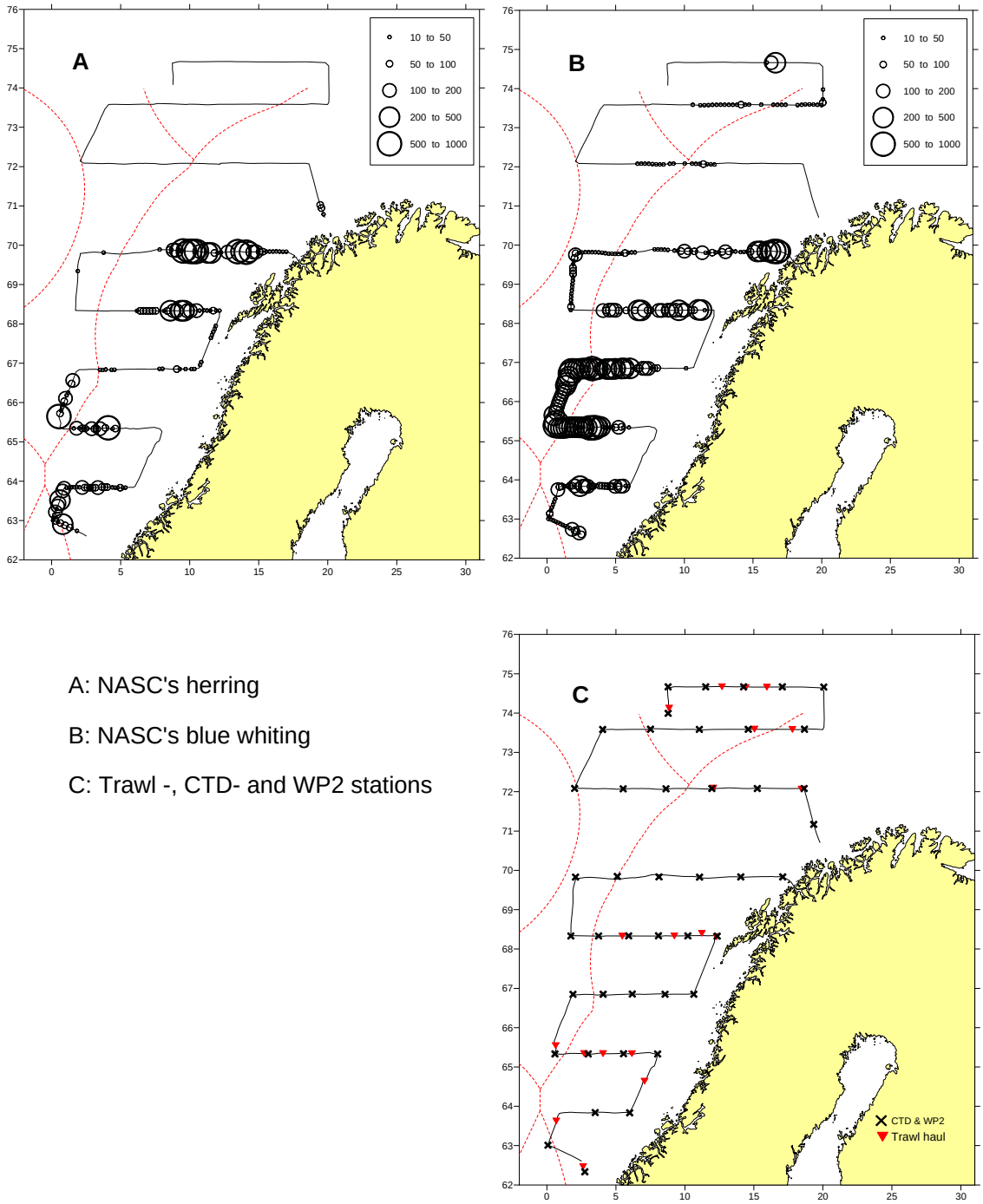
This survey is carried out in order to investigate distribution and migrations of the Atlanto-Scandian herring, blue whiting and other pelagic fish and to produce a biomass index for herring and a recruitment index for blue whiting for the Working Group on Widely Distributed stocks (WGWIDE). Furthermore, hydrographic conditions and plankton abundance in the Norwegian Sea and adjacent waters are monitored in order to investigate distribution and migration of herring and other pelagic fishes are influenced by environmental conditions.
The survey was coordinated with Norway as an international survey with participation of Norway, Iceland, Faroe Islands and EU, where the Danish R/V Dana conducted the EU survey part. The survey is coordinated by the ICES Working Group of International Pelagic Surveys, WGIPS, (previously WG on North East Atlantic Pelagic Ecosystem Surveys, WGNAPES). The survey is carried out as a joint EU survey with participation of UK, Ireland, Netherlands, Germany, Sweden and Denmark.

Types of data collected:

- Acoustic data
- Biological data: species composition, length measurements
- For herring and blue whiting samples following parameters was measured on 50 individuals from each haul: length, weight, sex, maturity and age (from scales of herring and otoliths of blue whiting)
- Zooplankton using a WP2 net
- CTD: hydrographical data

Achievements in 2013:

- 29 days at sea (as planned incl. calibration; 20 effective survey days in the working area)
- 19 pelagic trawl hauls
- 43 CTD stations
- 43 WP2 stations
- 3027 Nm acoustic integration




A: NASC's herring

B: NASC's blue whiting

C: Trawl -, CTD- and WP2 stations

**Figure III.G.7 Map showing the RV Dana IESNS 2013 survey track, pelagic trawl, CTD and WP2 stations.**

**International herring larvae survey (IHLS)**

The sampling for the International herring larvae survey was done during the 1st quarter IBTS and 73 out of 80 planned MIK (2 m ringnet) stations were covered in 2013 (Fig. III.G.8).

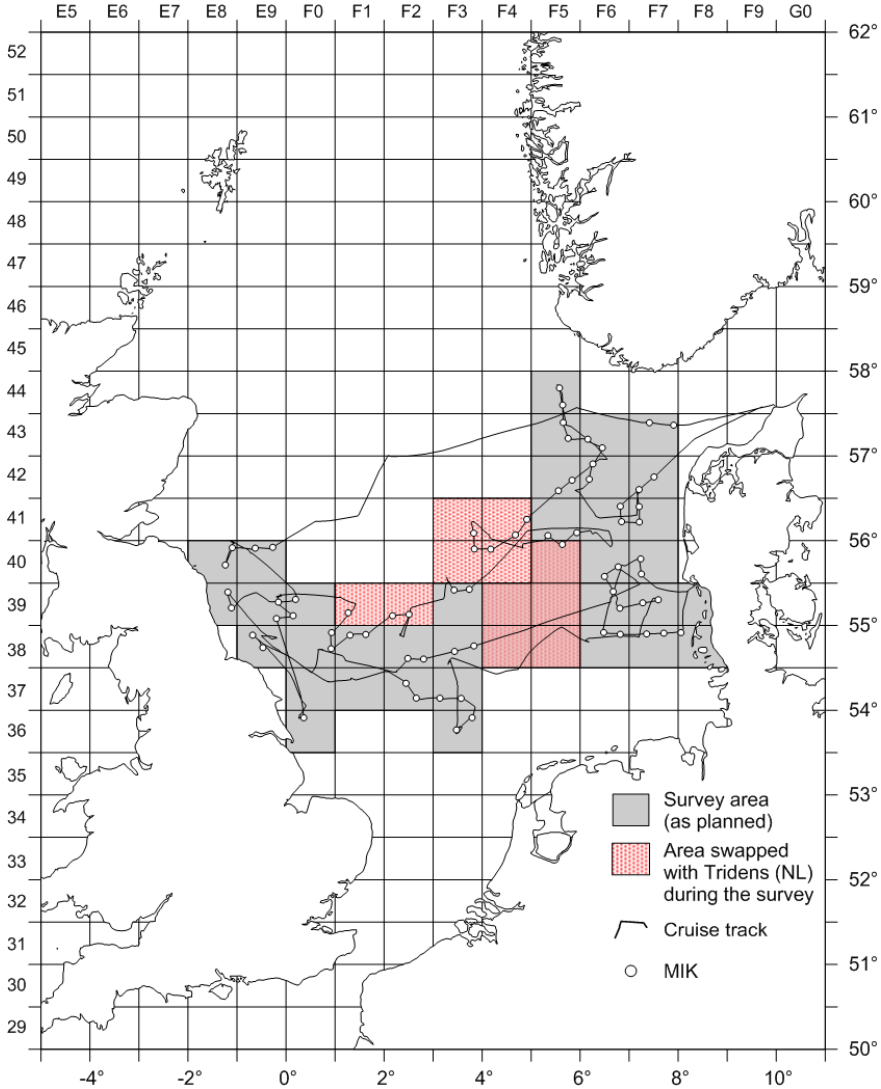



**Figure III.G.8 Map showing IBTS first quarter 2013 RV Dana survey area, cruise track and MIK haul positions.**

**NS Herring Acoustic Survey (NHAS)**

The purpose is to provide acoustic abundance estimates of herring and sprat in the North Sea (eastern part), Skagerrak and Kattegat. The survey is coordinated by the ICES Working Group for International Pelagic Surveys, WGIPS, and is a part of the international acoustic survey of the North Sea and adjacent areas.

Types of data collected:

- Acoustic data
- Biological data: species composition, length measurements
- For herring age and maturity measurements
- Hydrographical data using CTD

Achievements in 2013:

- 14 days at sea (as planned)
- 37 trawl hauls
- 37 CTD stations
- 20 WP2 stations
- 1864 Nm acoustic integration

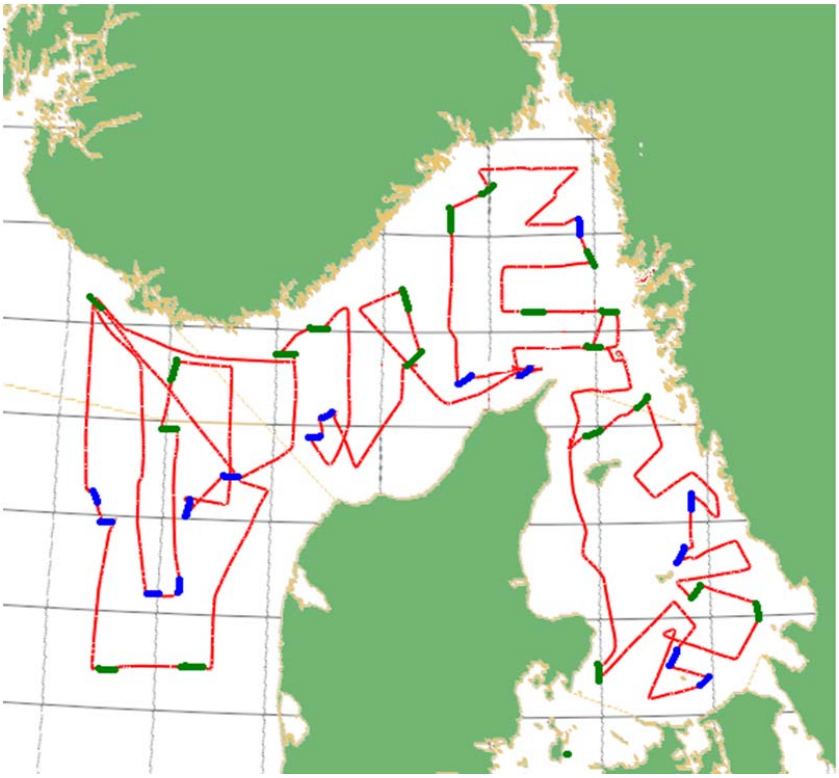


**Figure III.G.9 Map showing the RV Dana NHAS 2013 survey track and trawl locations (green dots: pelagic trawl, blue dots: bottom trawl).**

### Baltic International Acoustic Survey (BIAS)

Denmark has participated with one scientific staff member on the German R/V Solea in 2013.

### International blue whiting spawning stock survey (IBWSS) in areas VI and VII

Denmark has participated with one scientific staff member on the Dutch R/V Tridens and the Irish R/V Celtic Explorer in 2013.

### Nephrops UWTV survey in functional unit 3 and 4

The purpose of the survey is to estimate the abundance of *Nephrops* in Skagerrak and Kattegat. An underwater video technique is used and later the video footage is analysed in laboratory to estimate the *Nephrops* abundance in selected survey areas. The 2013 survey was conducted with R/V Havfisken in April/May. The survey covers the main *Nephrops* fishing grounds in Skagerrak (Subarea 1) and Kattegat (Subarea 2), respectively, and station allocation follows a random design.

Achievements in 2013:

- 13 days at sea (planned: 15)
- 116 stations (planned: 120).

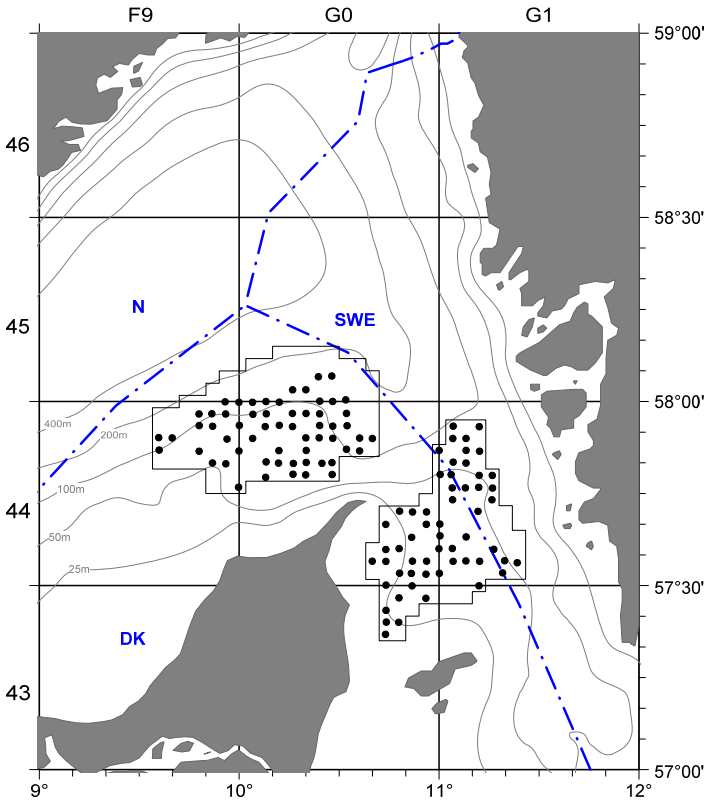



**Figure III.G.10 Map showing the achieved and sampling locations in the 2013 Nephrops UWTV survey.**

**North Sea sandeel survey**

The purpose of the sand eel dredge survey is to collect sand eels buried in the seabed and compare catches (number and age composition) with the previous year's collections to assess year class strength of the lesser sand eel (*Ammodytes marinus)* in the different areas adopted by ICES in 2009. Data from the dredge survey is the basis for calculating a 0-group index, which is used in stock assessment. The 2013 survey was conducted with the commercial fishing vessel Salling.

Achievements in 2013:

- 15 days at sea (as planned)
- 165 dredge hauls and 37 sediment grab sample distributed over 55 sample positions (planned: 56).

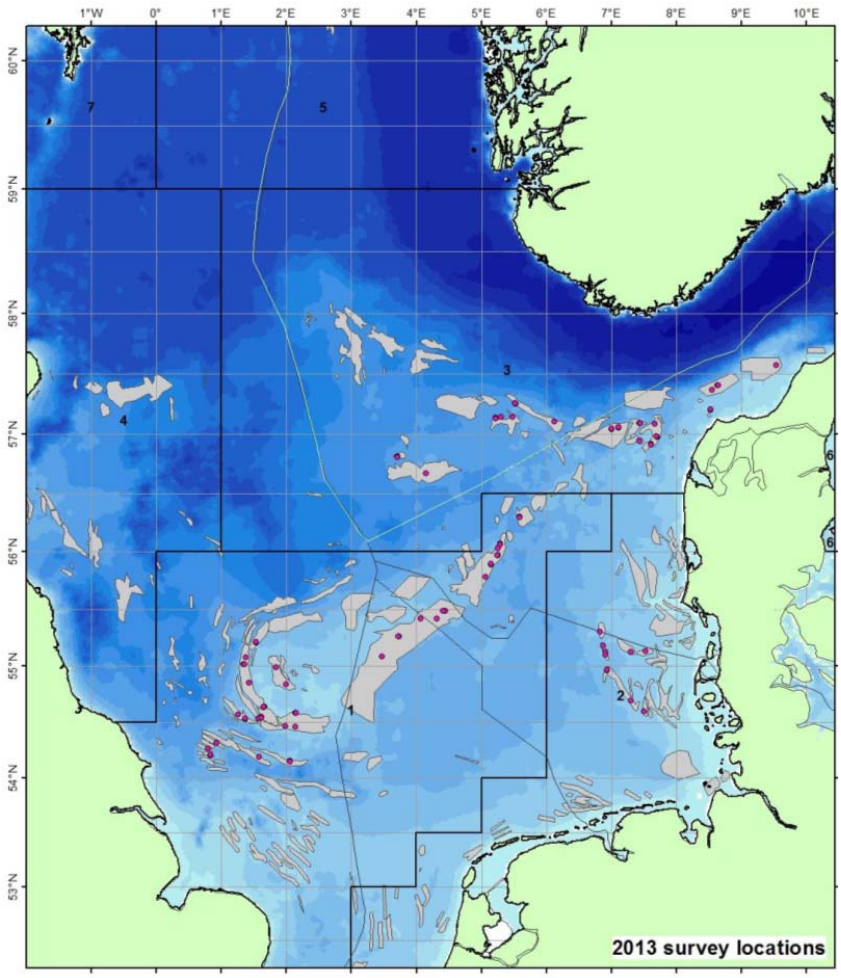



**Figure III.G.11 Map showing the sampling locations in the 2013 sandeel survey with the commercial fishing vessel Salling (red dots).**

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

No serious data quality problems or deviations from the NP occurred in 2013.

### III G 3 Follow-up of Regional and international recommendations

All surveys were conducted according to international or national manuals and guidelines.

### III G 4 Action taken to avoid shortfalls

No major shortfalls.

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

## IV.A Collection of data concerning the aquaculture

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

**Definition of the 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 are no deviations from definition given by the DCF.

**Segmentation**

Data is 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.

**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 2012 there were 157 farms distributed on 86 companies. The production volume was 17,819 tonnes and the value was 57 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 2012 consisted of 29 farms distributed on 17 companies. The production volume was 10,093 tonnes and the value was 28.6 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 systems producing European Eel in 2012 consisted of 8 farms distributed on 8 companies. The production volume was 1,382 tonnes and the value was 14.1 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.

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.

**Sea based farming**

Sea cage farms in Denmark produce Rainbow Trout in cages. In 2012 there were 17 farms distributed on 6 companies. The production volume was 12,948 tonnes and the value was 58.2 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 17.8 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 2012 there were 11 farms distributed on 10 companies. The production volume was 1,076 tonnes and the value was 1.1 million EUR. The production methods in the segment are very homogeneous.

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

As described in the National Programme Proposal, for some segments only a small number of companies are expected to participate in the account data survey. Hence, for discretional reasons only main sums regarding production and account data may be presented for these segments.

Farms in the Danish segment *Other farms* are producing Turbot, Pike Perch, Pollan/Powan, European Perch, Barramundi and a few other species in very small scale. In 2012 this segment consisted of 7 farms from 3 companies. Both the species produced, and the techniques used are very different in this segment. Hence the segment is not presented.

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

In Appendix XI of Commission Decision 2008/949/EC 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 is not carried out.

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

To avoid the small number of shellfish companies participating in the 2011 account data survey, DST has launched a campaign to recruit new companies. DST has participated in a meeting in the national shellfish farming organisation, and letters with recruitment papers has been send out to all of the members of the shellfish organisation. As a result of this campaign 4 of 10 shellfish companies participated in the 2012 survey. Hence, account data can again be shown for the shellfish segment.

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

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

**Definition of population**

The Danish fish processing industry is defined by the Business Register. In the Business Register the fish processing industry is defined by the NACE code 10.20. (European NACE rev. 2), which includes:

NACE 10.20.10 – Fish processing and preservation.

NACE 10.20.20 – Smoking, curing and salting of fish etc.

NACE 10.20.30 – Fish meal factories.

For enterprises that carry out fish processing, but not as a main activity, it is mandatory to collect the following data, in the first year of each period:

a) Number of enterprise and
b) Turnover attributed to fish processing.

The number of enterprises and the turnover attributed to fish processing can be extracted from Statistics Denmark Industrial Commodity Statistics and Account Statistics. The “purity” of the processing industry is very high. In 2011 about 98 % of the commodities, which contain fish or fish products, were produced in the branches defined by the European NACE code 10.20. There were only 5 non NACE-10-20 enterprises with fish processing in 2011. Due to the limited numbers of enterprises and rules of confidentiality the total turnover from these enterprises cannot be shown.

The Danish data collection for the processing industry covers the whole population defined by the Business Register NACE 10.20, which corresponds to a 100% response rate. The data collection is based on the Danish Account Statistics collected by Statistics Denmark covering 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.

The industrial commodity statistics describe manufacturers' sales of commodities measured in volume and value. This statistics is used for classification of firms into subgroups by species and product form.

**Planned sampling**

The type of data collection is census (A).

The Danish data collection is based on data from the Account Statistics collected by Statistics Denmark. The Account Statistics covers all enterprises in the Danish fish processing industry. 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.

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 IFRO and Statistics Denmark.

**Segmentation**

In the national proposal the processing industry was divided into 13 sub branches. Due to the limited numbers of enterprises and rules of confidentiality, the 13 sub branches are merged to 6 sub branches.

IFRO has examined the composition of commodities from each enterprise in the processing industry for the years 2000 until 2011. This investigation has provided the background for dividing the enterprises into 6 sub branches on the basis of the enterprise's commodity production. The first criteria for the division of the sub branches is the species that the enterprise processes and secondly the degree of processing. The 6 sub branches also reflect the most important species in the Danish primary sector, and if there is a change in the supply of raw material, it will probably reflect on these groups. The 6 sub branches will probably also reflect the social and economic impact, on the processing industry of measures taken on behalf of the common fisheries policy.

Data can also be segmented into 4 groups based on the number of employed calculated as Full-time equivalents according to Appendix XII of Commission Decision 2008/949/EC.

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

All requested indicators listed in Appendix XII of Commission Decision 2008/949/EC are collected in the Danish data collection program for the fish processing industry.

In the data collection program 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.

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

IFRO 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.

IFRO experts have participated in the following meetings under the Scientific, Technical and Economic Committee for Fisheries (STECF):

Annual Economic Report of the EU Fish Processing sector 2013, 14-18 of October 2013.

Follow-up of recommendations from the STECF: Report on the Evaluation of Data Collection Related to the Fish Processing Sector (SGECA 09 03). STECF observes that the working group report presents possible deeper economic analysis based on data collected under the old and new data regulations. The possibilities presented here are ambitious, and are not feasible if economic data are provided on a national level only, as requested by the DCR/DCF. In order to be able to conduct the analyses proposed here, STECF recommends that at the national institutes, data should be disaggregated by either type of commodity or by company size.

Data for the Danish processing industry can be disaggregated by both type of species/commodity or by company size as recommended by the STECF.

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

There are no shortfalls in the data collection program for the processing industry in Denmark.

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

## V. 1 Achievements: results and deviation from NP proposal

The indicators 1, 2, 3 and 4 listed in Commission Decision 2010/93/EC Appendix XIII of the Commission Decision require data on species abundance and length distribution by species from fishery independent research surveys. These data has been collected through the annual surveys carried out by DTU Aqua. The spatial and temporal coverage of data collection for the evaluation of effects of the fishing sector will consist of area IV in the first and third quarters and in area IIId in the first and fourth quarters 2013.

VMS data has been used for indicators 5-7 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 on a resolution of one record every 1 hour. As described below in section VI A “Management and the use of the data” logbooks, selling slips and VMS data are available. Therefore, it has been possible to link VMS, Logbook and sales slips data.

Indicator 8 can be calculated by using the collected 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.

There has been no deviation from the NP.

## V. 2 Actions to avoid shortfalls

No action is needed.

# VI. Module for management and use of the data

## VI. 1 Achievements: results and deviation from NP proposal

Primary data collected under the Danish programme has been as planned stored in the following computerised databases:

- Vessel register. Data on fishing capacity. (AgriFish Agency)
- Logbook database. Data on origin of catches and on effort. (AgriFish Agency)
- Sales notes database. Data on quantities landed and prices. (AgriFish Agency)
- Species composition database. Data on species composition in landings for industrial purposes. (AgriFish Agency)
- 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 has been 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.

The collected biological data has been stored in a database ("Babelfisk") managed by DTU Aqua. These primary data are surrounded by confidentiality and will not be passed on to other persons or authorities without permission.

Economic data has been 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 has been produced and are 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.

Regional database development and data management "RDB-FishFrame" was in 2012 transferred to ICES and has been running since. During the RCM meeting for the Baltic, the NS&EA and the NA the RDB-FishFrame data was used for the analysis of the status of the data collection and for the planning of the data collection in 2013.

Denmark has provided 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 has provided data to other end user if requested.

### VI. 2 Actions to avoid shortfalls

No action is needed.

## VII. Follow-up of STECF recommendations

Denmark has taken the recommendations made by the Expert Working group (Evaluation of the 2009, 2010, 2011, 2012 Annual report and the evaluation of 2012-13 National Programme) under consideration while writing the Annual report for 2013.

For the 2012 and 2013 STECF plenary meeting reports no DCF relevant recommendations were found.

| Source | Recommendation | Action |
|---|---|---|
| EWG 11-08 June 2011 | EWG 11-08 recommends that information and description of the method/software used for calculation of CV's should be included (or referred to) in the AR if not provided in NP | A description is given in the AR 2012 |
| EWG 11-08 June 2011 | EWG 11-08 recommends for the AR tables, Table II.B.1 (list of eligible meetings) that is provided by the Commission should be used and all meetings and not only the meetings attended should be provided. | Denmark has followed the recommendation |
| EWG 11-08 June 2011 | EWG 11-08 recommends that MS set-up a website on their data collection. They are obliged (by DCF regulation) to do so. No MS mentioned or referenced in the AR to such websites. | Denmark expected the web-site will be finalized in 2012. At DTU Aqua the website had to be moved to a new platform and therefore reconstruction of the DCF site has to be made. The new website will be up running |

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| | | within the next two month. |
| EWG 11-08 June 2011 | EWG 11-08 recommends that in cases that a research vessels is not available for carrying out a contribution to a DCF survey, that MS in question should demonstrate that it made all necessary efforts to carry out the survey. MS must make provisions so that such problems do not happen e.g. seek assistance from other MS or charter a vessel). | Denmark has always used this practice. |
| 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. | At present various approaches have been used depending of the species concerned. Denmark will work for increased standardization the Baltic Region. |
| SGRN 10-01 | Overall the MSs need to provide more detailed information on the methods used to collect and analyze economic variables which are not clearly defined in the commission decision (capital value and costs, value of quotas and fishing rights, FTE national, imputed value of unpaid labor and fuel efficiency of fish capture). | Detailed description is given in the NP and AR. |
| SGRN 10-01 | Overall most of the MSs need to provide more detailed information and description about the methodologies planned in the estimation process of the economic variables, the methods used to provide measures to assess data quality | Detailed description is given in the NP and AR. |
| SGRN 10-01 | Overall most MSs did not provide information for inactive vessels. SGRN invites the MSs to provide information on inactive vessels in the NPs. | Detailed description is given in the NP and AR. |
| SGECA-09-02 (2009) | SGECA-09-02 recommends that MS should carefully assess the impact of non-response, especially in the case of census with low response | Statistics Denmark contacts the fishery accountants before drawing the sample to get an |

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| | rate. | acceptance of the delivery of a harmonized account for the fisherman/fishing firm. The acceptance is set up in a contract, where we guarantee the payment of app. DKK 3000 per completed account. We do not have low response rate. |
| SGRN February 2009 Evaluation of NP 2009-2010 | Economic and Transversal Variables: the method for raising the sample results to the total population is not clearly presented. More clear information of the method used for this calculation is needed. | Denmark is using census data. |
| SGRN February 2009 Evaluation of NP 2009-2010 | Metier-related variables; It is not clear if <10 are included. | All Danish vessels are including for the ranking and vessels < 10 meters are included. |

# VIII. 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 |
| AgriFish Agency | AgriFish Agency |
| IFRO | Danish Food and Resource Economics Institute, Denmark |
| FTE | Full Time Equivalent |
| ICES | International Council for the Exploration of the Sea |
| IQ/ITQ | Individual quota / Individual transferable quota |
| WKBALPEL | Workshop on data for Baltic Pelagics |
| WKADS | Workshop on Age Determination of Salmon |
| WKBENCH | Benchmark Workshop on Saithe, Haddock, Herring and Horse Mackerel Stocks |
| WGBYC | Working Group on Bycatch of Protected Species |
| WKCOD | North Sea cod benchmark |
| PGCCDBS | Planning Group on Commercial Catches, Discards and Biological Sampling |
| ADGSANDEEL | Sandeel Advice Drafting Group |
| WKARGH | Workshop on Age Reading of Greenland Halibut |
| WKARAS | Workshop on Age reading of European Atlantic Sardine |
| WCSANDEEL | ACOM WebEx to finalise sandeel advice |
| WGMME | Working Group on Marine Mammal Ecology |

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|---|---|
| WKROUNDMP | Joint ICES-STECF Workshop on management plan evaluations for roundfish stocks |
| WGDEEP | Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources |
| HAWG | Herring Assessment Working Group for the Area South of 62ºN |
| WKAREA-2 | Workshop on Age Reading of European and American Eel |
| WGNAS | Working Group on North Atlantic Salmon |
| WGBAST | Baltic Salmon and Trout Assessment Working Group |
| WKCPUEFFORT | Workshop on the utility of commercial CPUE and VMS data in assessments |
| WCDSS | ACOM WebEx to finalize advice on deep sea surveys |
| WGBFAS | Baltic Fisheries Assessment Working Group |
| WGECO | Working Group on the Ecosystem Effects of Fishing Activities |
| NWWG | North-Western Working Group |
| AFWG | Arctic Fisheries Working Group |
| PGRFS | Planning Group on Recreational Fisheries Surveys |
| WGNSSK | Working Group on the Assessment of Demersal Stocks in the North Sea and Skagerrak |
| WGHMM | Working Group on Hake, Monk and Megrim |
| WGCSE | Working Group for the Celtic Seas Ecoregion |
| WKSHARK | Workshop on splitting of deep water shark historical catch data WKSHARK |
| WKMSHS | Workshop on Sexual Maturity Staging of Herring and Sprat |
| WGEF | Working Group on Elasmobranch Fishes |
| WGANSA | Working Group on Anchovy and Sardine |
| SGPIDS | Study Group on Practical Implementation of Discard Sampling Plans |

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| WGHARP | Working Group on Harp and Hooded Seals |
| WGWIDE | Working Group on Widely Distributed Stocks |
| WGMIXFISH | Working Group on Mixed Fisheries Advice for the North Sea |
| WKNARC | Workshop of National Age Readings Coordinators |
| WGEEL | Joint EIFAC/ICES Working Group on Eels |
| SGRF | Study Group on Recruitment Forecasting |
| WKPICS1 | Workshop on practical implementation of statistical sound catch sampling programmes |
| WKMSREGH | Workshop on Sexual Maturity Staging of Redfish and Greenland Halibut |
| WGRS | Working Group on Redfish Surveys |
| NIPAG | Joint NAFO/ICES Pandalus Assessment Working Group |
| SGBALANST | Study Group on Data Requirements and Assessments Needs for Baltic Sea Trout |
| SIMWG | Stock Identification Methods Working Group |
| WGNEW | The Working Group on Assessment of New MoU Species |
| 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 |
| SCV | Standard Catch Value = landings per species multiplied by 3-year average prices. |

# IX. Comments, suggestions and reflections

None

# X. Appendix

## Appendix 1 - Calculating coefficient of variation

Denmark is still in the process of developing methods for calculating the coefficient of variation (CV) suited for the Danish sampling schemes. This year a more proper weighting of the means and variance – taking the strata into account - have been implemented in the estimation of the CV around the length distribution (Cadima *et al*. 2005). The methods are still under development and therefore the presented results are preliminary. The methods presented are based on a simple resampling method.

Metier-related variables – CV around the length distribution in the landing

The CV's has been calculated by taking n bootstrap samples from the original population of n sampled trips in a stratum (species, metier and fishing ground). The bootstrap unit are the entire length distribution of a trip (not bootstrapping the individual length groups) thereby maintaining covariance between the length groups within a haul. The bootstrap sampling was repeated 500 times for each stratum. In the final estimates the mean and variance have been weighted according to sample size per strata (Cadima *et al*. 2005).

Metier-related variables – CV around the length distribution in the discard

The CV's has been calculated by taking n bootstrap samples from the original population of n sampled trips in a stratum (species, size sorting and fishing ground). The bootstrap unit are the entire length distribution of a trip (not bootstrapping the individual length groups) thereby maintaining covariance between the length groups within a haul. The bootstrap sampling was repeated 500 times for each stratum. In the final estimates the mean and variance have been weighted according to sample size per strata (Cadima *et al*. 2005).

Stock-related variables – CV for length and weight at age

The CV's for length and weight at age has been calculated by taking n bootstrap samples from the original population of n sampled fish per stratum (age, species and fishing ground). The bootstrap sampling was repeated 500 times for each stratum. For each bootstrap sample the mean length and weight has been calculated and afterwards the CV around the mean lengths and weights from the 500 bootstrap samples has been calculated - the latter being the presented precision (CV).

**Cadima, EX.; Caramelo, A.M.; Afonso-Dias, M.; Conte de Barros, P,; Tandstad, M.O.; de Leiva-Moreno, J.I.**
Sampling methods applied to fisheries science: a manual.
FAO Fisheries Technical Paper. No. 434. Rome, FAO. 2005. 88p

## Appendix 2 – Bilateral agreements

Agreements are given in separate files.