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

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

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

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

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

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

## Commission Implementing Decision (EU) 2016/1701 of 19 Aug 2016

laying down rules on the format for the submission of work plans for data collection in the fisheries and aquaculture sectors

# **German Work Plan for data collection in the fisheries and aquaculture sectors**

## 2017-2019

Version 1.0 – October 2016

[Hamburg, 31 October 2016]

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## SECTION 1: BIOLOGICAL DATA

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

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

#### **1. Aim of pilot study**

The objective of the recreational fisheries data collection is to estimate total numbers of marine recreational fishers and effort according to fishing platforms (boat, charter boat, shore fishing). Further estimates of caught and released components for all target species (concurrent/multispecies survey) in the recreational fishery will be conducted.

#### **2. Duration of pilot study**

According to EU Decision 2016/1251, we will utilise a 1-year-telephone-diary survey conducted in 2014-2015 with the final analysis and weighting procedure conducted in 2017.

Annually, we will conduct on-site surveys (mainly focusing on cod and salmon in the Baltic Sea) to obtain time series data on CPUE and collect catch composition data. In addition, a remote camera survey will be conducted to monitor salmon trolling fishing effort in the Baltic Sea.

According to survey results and end-user needs, we will continue to further improve our national surveys and plan the next nationwide marine recreational fisheries survey to obtain new effort estimates.

#### **3. Methodology and expected outcomes of pilot study**

For estimating total numbers of fishers, total effort by fishing mode and caught and released components of target species, we will utilise a nationwide 1-year-telephone-diary survey conducted in 2014-2015. To ground-proof the results, we will conduct annual on-site access-point intercept surveys of randomly chosen sites and dates to collect CPUE data. Onboard sampling during charter boat trips will be used to collect biological catch composition data (length measurements) for all caught and released species during the sampled trips of this sector.

The evaluation of the 1-year-telephone-diary survey will also yield results on marine recreational fisheries related expenditure and qualitative data on the acceptance of certain management measures, for example.

For specialised fisheries (e.g. salmon trolling in the Baltic Sea), independent surveys will be conducted, i.e. remote cameras in harbours to monitor boat fishing effort & on-site access point intercepts for CPUE and catch data composition (see above).

In the case that there is a need to quantify post-release mortality of released fish in the recreational fishery due to significant releases rates (revealed by the 1-year-telephone-diary survey or caused by new management measures), we will conduct post-release mortality experiments for the corresponding species.

## SECTION 1: BIOLOGICAL DATA

### **Text Box 1E: Anadromous and catadromous species data collection in fresh water**

*General comment: This Box fulfills paragraph 2 points (b) and (c) of Chapter III of the multi-annual Union programme and Article 2 of this Decision.*

#### **Eel (*Anguilla anguilla*)**

As required by Decision EU 2016/1251, the data collection in all German Eel Management Units (EMUs) will be organised as follows:

- Biological variables (age, length, sex, maturity)
  - Sampling of silver eels from commercial catches
  - Spawner quality assessed in sub-samples (e.g. contamination status, fat content, parasitisation)
- Annual catch quantities in EMUs as reported by fishermen
- Recruitment
  - Natural recruitment: regional (non-DCF) glass eel monitoring /ICES time series
  - Stocking: number of glass eels and elvers, as reported in national stocking statistics
  - Larval surveys in the spawning area of the European eel
- Abundance of standing stock and silver eel escapement
  - calculated via German Eel Model III (Oeberst & Fladung 2012)

Due to methodological challenges and obstacles in the legislative structure of the German federal system, the following data collection remains optional and sampling details are not yet established:

- Assessment of yellow eel stock
- Quantification of silver eel escapement by mark/recapture studies
- Establishment of a continuous glass eel monitoring in at least one EMU
- Additional analyses of yellow eel otoliths in order to assess the net-benefit of stocking (depending on the implementation of national programmes to mark otoliths of all stocking material in selected EMUs)

Assessment of yellow eel stock and quantification of spawner escapement is planned in at least one EMU during a 3-year pilot phase in order to establish a statistically sound sampling scheme. Future assessment frequency will be adjusted according to experience from these studies.

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

Even though Germany has no index rivers for Atlantic salmon, four North Sea river systems (Ems, Elbe, Weser, Rhein) are included in the NASCO list. Also, there is increasing interest by regional authorities as end-users in comprehensive national data collection of this species. As a first step, collection of available data is necessary to evaluate and fulfil current requirements.

## SECTION 1: BIOLOGICAL DATA

### **Pilot Study 2: Level of fishing and impact of fisheries on biological resources and marine ecosystem**

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

#### **1. Aim of pilot study**

Improve availability of data and tools for estimating the level of fishing and the impact of fishing activities on marine biological resources and on marine ecosystems

#### **2. Duration of pilot study**

36 months (1 Jan 2017 – 31 Dec 2019)

#### **3. Methodology and expected outcomes of pilot study**

Methodology and approaches to address the impact of fishing on biological resources are fundamentally different from the methods needed to assess the impact of fishing on marine ecosystems and habitats. Therefore, Germany will address the two issues in two separate pilot studies.

Fundamental changes in the importance of natural versus fishing induced mortality are observed while moving towards MSY management target. The comprehensive reduction of fishing mortality and successive recovery of fish stocks, especially of the larger predatory species, led to an increasing natural mortality as opposed to fishing mortality. Consequently, estimates of natural mortality become more important for stock assessments and forecasts. A DG MARE tender (Contract No MARE/2012/02-SI2.632887) pilot study on stomach sampling in the North Sea and Baltic was able to prove, in cooperation with the ICES Working Group on Multi Species Stock Assessment Methods (ICES WGSAM), that cost-effective sampling of stomachs is possible during existing surveys. It was possible to analyse stomachs in a cost-effective manner with the help of national labs and/or external contractors. Results of the fishPi project (EU MARE/2014/19) conclude that opportunistic stomach sampling on existing DCF surveys is a promising way forward. However, missing regional coordination was identified a major problem by the project. The lack of coordination leads to unbalanced sampling effort resulting in a lack of statistically sound sampling of all key species needed for food web characterisation and finally does not allow moving towards the Ecosystem Approach to Fisheries (EAF). Based on the lessons learned from the DG MARE pilot study and the fishPi project, Germany will in this pilot study establish a regular sampling scheme for stomachs on its vessels during international and national surveys in close cooperation with ICES WGSAM, survey planning groups, regional coordination groups and international partner labs. The sampling will be carried out based on the guidelines from ICES WGSAM to ensure that data can be used for multi-species modelling, assessments and advice.

When it comes to assessing the impact of fishing on marine ecosystems, two aspects have to be considered: i) Bottom-contacting fishing gears potentially impact habitat quality and thus suitability and carrying capacity of marine ecosystems and ii) non-target species including rare and sensitive species are by-caught in the fishery potentially affecting ecosystem composition and functionality. Data on by-catch of the latter species in the different fisheries are still scarce. Incidental by-catch of elasmobranchs and marine mammals can only be quantified with large uncertainties. Germany will train observers to better distinguish between different shark, ray and skate species and will ensure that by-catch of non-commercial and sensitive species will be recorded during observer trips. Habitat degradation by fisheries needs to be assessed differently. First of all, the level of

fishing by metier needs to be determined at highest geographical resolution, to assess the overlap of fishing and habitat. Secondly, the impact of different gear types on the specific habitat type needs to be classified to assess the impact of fishing on habitat quality. In this pilot study, Germany will adapt existing methodology as applied by ICES WGSFD and OSPAR to establish a routine monitoring of fishing impacts on marine habitats. Combining indices of fishing impact on habitats with by-catch information on rare and sensitive species will allow addressing the impact of fishing on marine ecosystems.

The information on biological as well as technical interactions (including by-catch of non-commercial and sensitive species and habitat impact) in mixed fisheries needs to be combined in integrated modelling approaches. Under the new CFP, management strategies need to be established that ensure the ecological, social and economic sustainability of fisheries. Management plans need to take into account the knowledge on biological and technical interactions in mixed fisheries to reach this goal. Based on the traditional (including economics) and new information from the DCF pilot studies, Germany will help to develop and parameterise management strategy evaluation tools that account for mixed-fisheries and multi-species interactions and ecosystem considerations for the North Sea together with institutes from other EU Member States. This will allow an integrated impact assessment of management strategies and ensures that all available DCF data are utilised to provide the best possible advice.

## SECTION 1: BIOLOGICAL DATA

### Text Box 1G: List of research surveys at sea

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

#### **Mandatory surveys:**

##### **Baltic International Trawl Survey (BITS)**

1. Objectives of the survey

Target species are demersal fish species, mainly Baltic cod and flatfish species (flounder, plaice, dab, brill and turbot). The main aim is to determine the year-class strength of the target species. Target data are abundances, weight and length distributions of all fishes and length-weight-age-sex-maturity data of commercially important species as well as hydrographic data (temperature, salinity and oxygen). The collected data are saved in a national SQL database and submitted to the ICES DATRAS database. In addition, cod stomachs and marine litter are sampled.

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

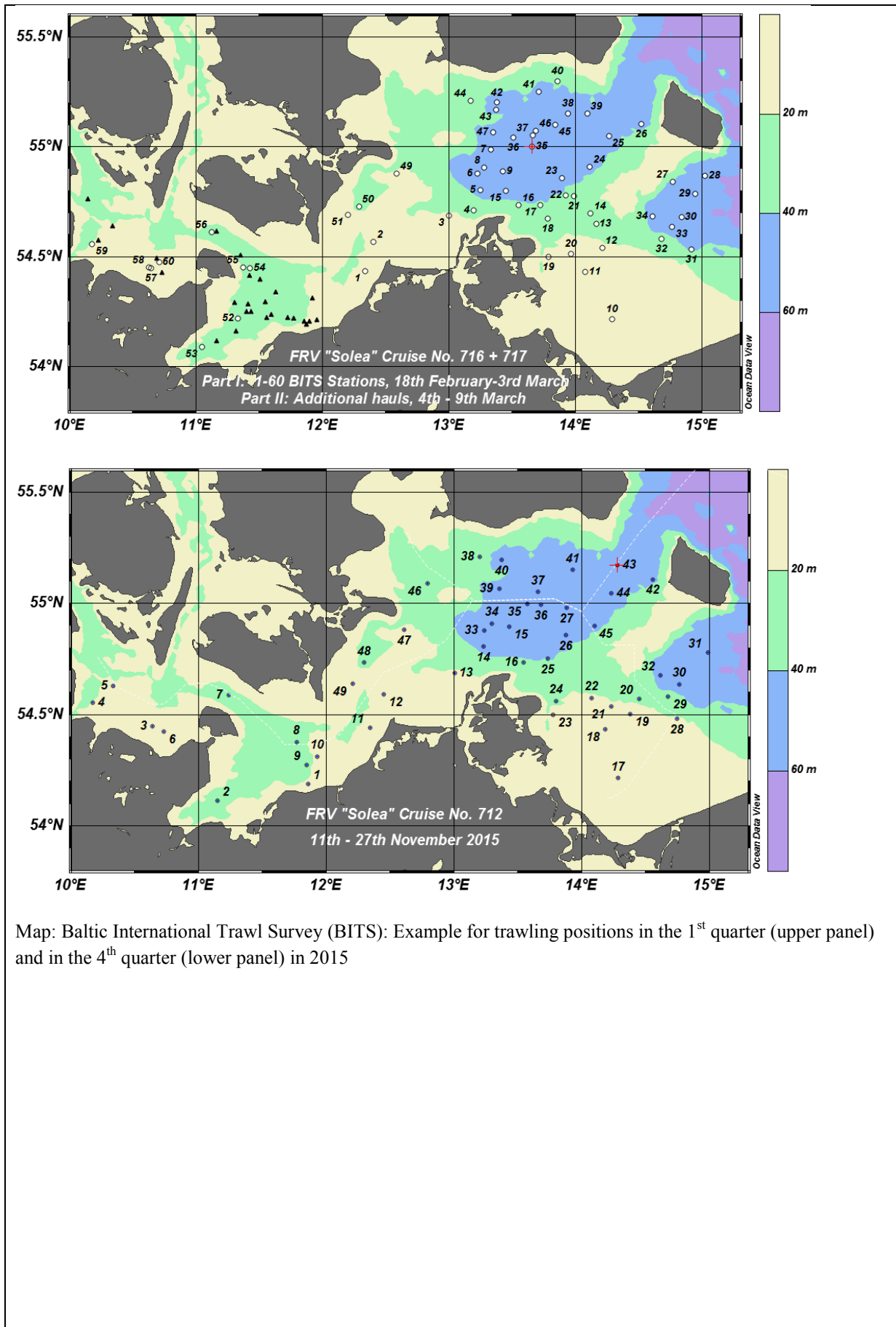
See survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Denmark (R/V DANA and R/V HAVFISKEN) and Sweden (R/V DANA), Germany (R/V SOLEA), Lithuania (R/V DARIUS), Poland (R/V BALTICA), Latvia (R/V BALTICA) and Estonia (R/V BALTICA) and Russia (R/V ATLANTNIRO). ICES WGBIFS is coordinating the planning of this survey.

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

The ICES survey planning group (WGBIFS) assigns the tasks to the survey participants (e.g. coverage of certain areas in a certain time frame). Each participating country is responsible for the activities conducted on its national part of the international survey.



Map: Baltic International Trawl Survey (BITS): Example for trawling positions in the 1<sup>st</sup> quarter (upper panel) and in the 4<sup>th</sup> quarter (lower panel) in 2015

## **Baltic International Acoustic Survey (BIAS, Autumn)**

### 1. Objectives of the survey

Target species are small pelagic fish species, mainly Baltic herring, sprat and additionally European anchovy. The main aim is to provide information on stock parameters of small pelagics in the Baltic Sea. Target data are biomass, weight and length distributions and length-weight-age-sex-maturity of small pelagic target species in the Kattegat and western Baltic Sea including Belt Sea, Sound and Arkona Sea as well as hydrographic data (temperature, salinity and oxygen). The data are saved in a national SQL database and storage in an ICES database is planned.

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

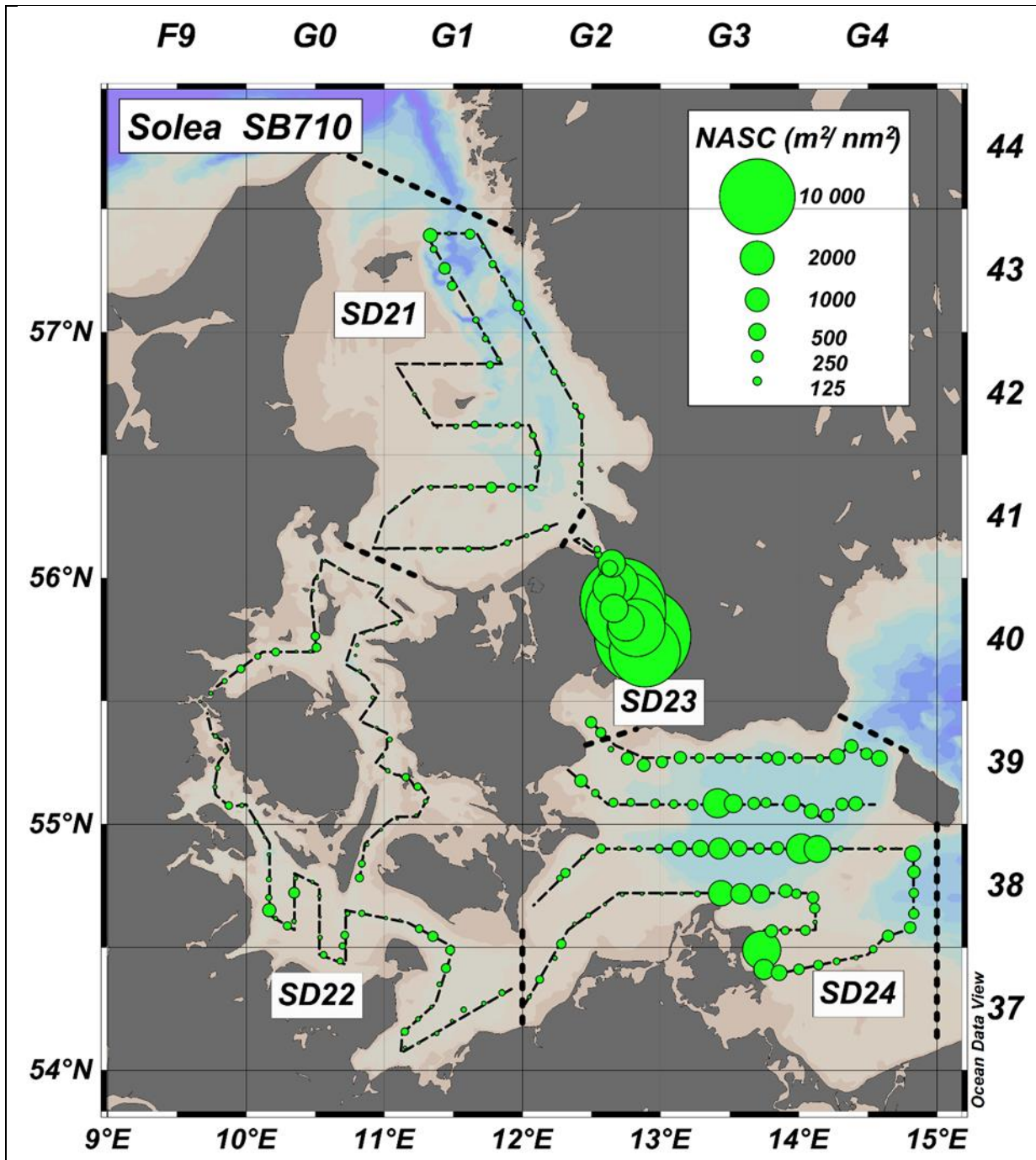
see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Denmark (R/V DANA) and Sweden (R/V DANA), Finland (R/V ARANDA), Germany (R/V SOLEA), Lithuania (R/V DARIUS), Latvia (R/V BALTICA), Poland (R/V BALTICA), Estonia (R/V ULRIKA) and Russia (R/V ATLANTNIRO). ICES WGBIFS is coordinating the planning of this survey.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

The ICES survey planning group (WGBIFS) assigns the tasks to the survey participants (e.g. coverage of certain areas in a certain time frame). Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: Baltic International Acoustic Survey (BIAS), October 2015: Example for cruise track and NASC values

## **Sprat Acoustic Survey (SPRAS)**

### 1. Objectives of the survey

Target species is sprat. The main aim is to provide information on stock parameters of sprat in the Baltic Sea. Target data are biomass, weight and length distributions and length-weight-age-sex-maturity of sprat in the western Baltic Sea including Belt Sea, Sound, Arkona Sea and Bornholm Sea as well as hydrographic data (temperature, salinity and oxygen). The collected data are saved in a national SQL-database and storage in an international database is planned.

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

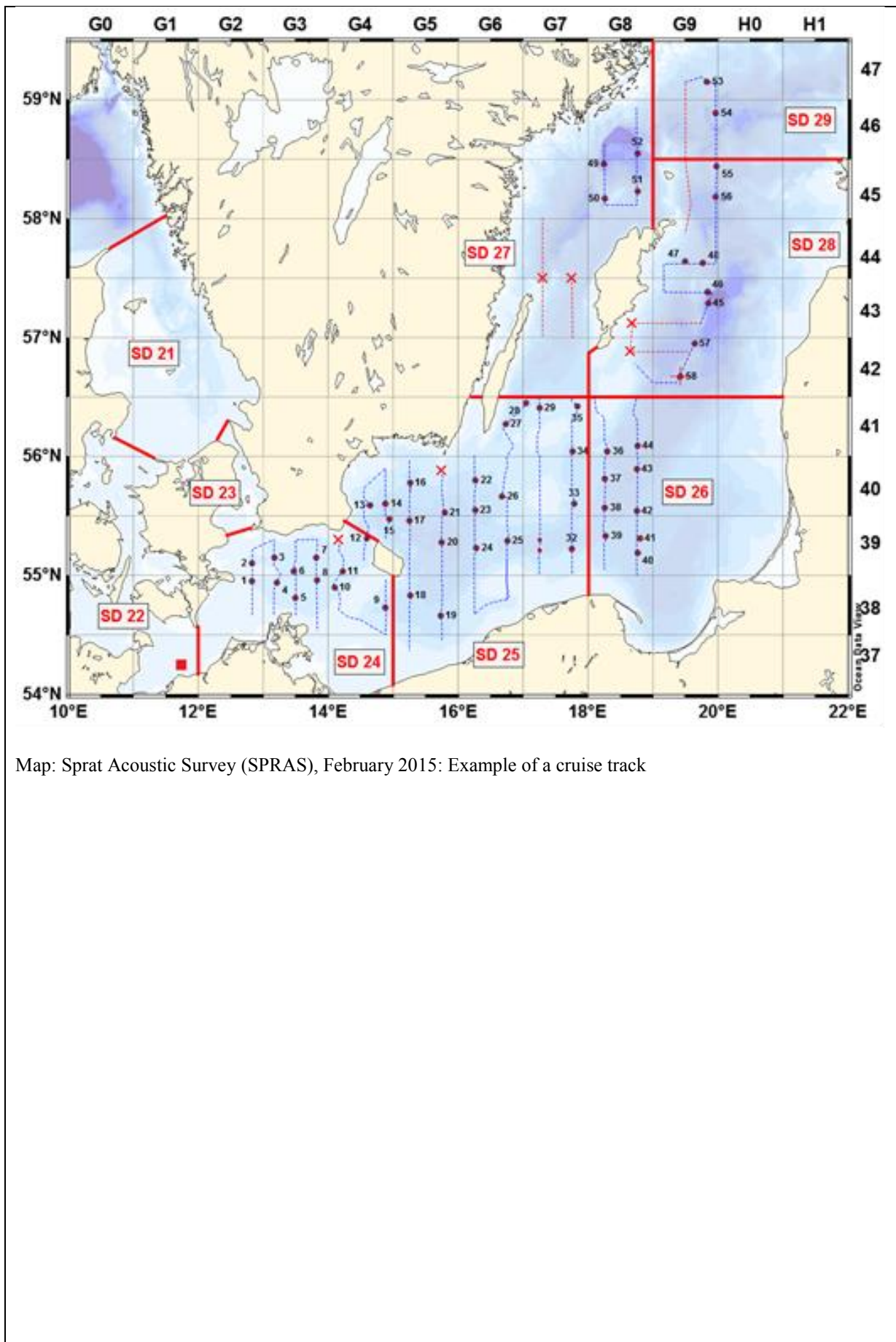
see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Denmark (R/V DANA and R/V HAVFISKEN) and Sweden (R/V DANA), Germany (R/V WALTER HERWIG), Lithuania (R/V DARIUS), Poland(R/V BALTICA), Latvia (R/V ULRICA), Estonia (R/V ULRICA) and Russia (R/V ATLANTNIRO). ICES WGBIFS is coordinating the planning of this survey.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

The ICES survey planning group (WGBIFS) assigns the tasks to the survey participants (e.g. coverage of certain areas in a certain time frame). Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: Sprat Acoustic Survey (SPRAS), February 2015: Example of a cruise track

## Rügen Herring Larvae Survey (RHLS)

### 1. Objectives of the survey

Target species is the western Baltic spring-spawning herring. The main aim is to monitor the spawning activity of the spring-spawning herring of the Western Baltic Sea in its main spawning area, the Greifswald Bay. Target data are a high-resolution spatial and temporal records of the larval abundance during the entire spawning period as well as hydrographic data (temperature, salinity and oxygen). The collected data are stored nationally and in the ICES Fish Eggs and Larvae dataset.

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

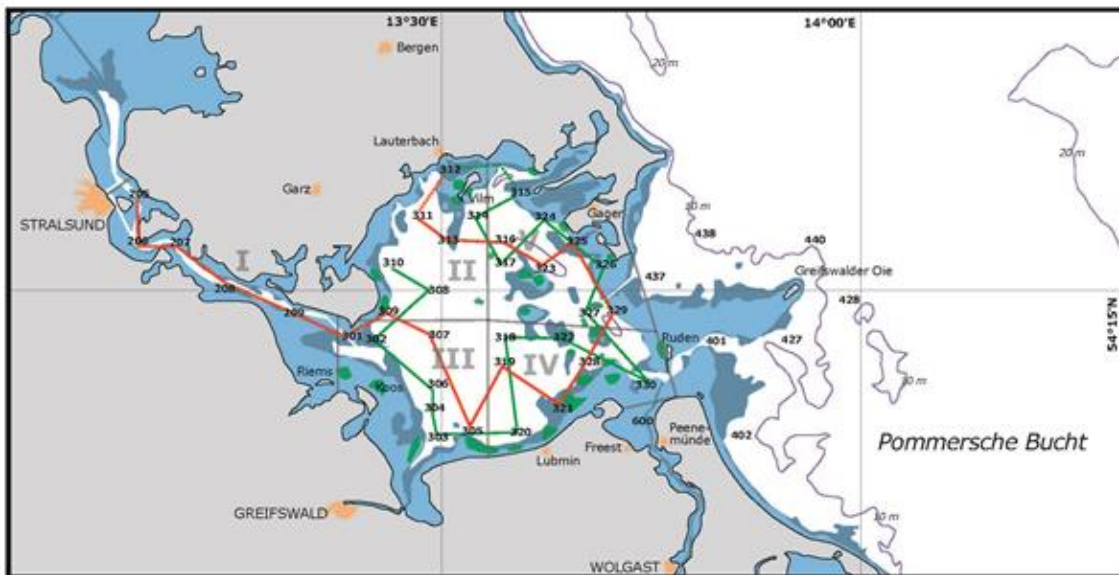
Manual is available on request.

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

National survey only.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only.



Map: Rügen Herring Larvae Survey (RHLS), March-June 2015: Cruise track and station plan

## **International Bottom Trawl Survey, Quarter 1 (IBTS Q1)**

### 1. Objectives of the survey

- To determine the distribution and relative abundance of pre-recruits of the main commercial species with a view of deriving recruitment indices;
- To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
- To monitor the distribution and relative abundance of all fish species and selected invertebrates;
- To collect data for the determination of biological parameters for selected species;
- To collect hydrographical and environmental information;
- To determine the abundance and distribution of late herring larvae in order to provide the ICES Herring Assessment Working Group (HAWG) with a recruitment index for the North Sea herring stock.

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

Bottom trawling with a standard GOV trawl; CTD casts; Plankton net haul with a MIK net;

#### Survey manuals

ICES 2015: Manual for the International Bottom Trawl Survey, Revision IX. SISP 10

and

ICES 2013: Manual for the Midwater Ring Net sampling during the IBTS Q1, Revision 2. SISP 2

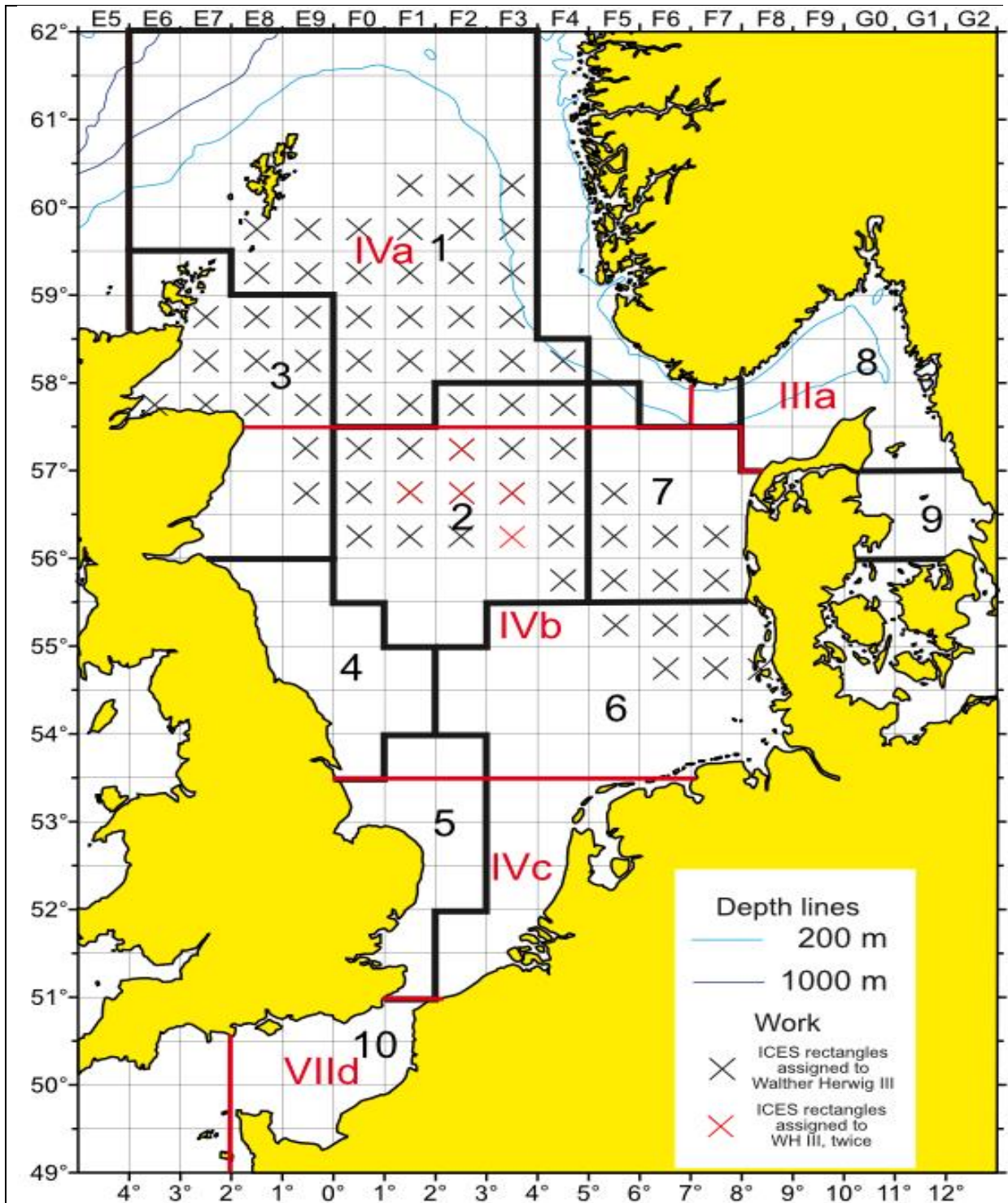
### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

France: RV Thalassa, The Netherlands: RV Tridens, Germany: FRV Walther Herwig III, Denmark: RV Dana, Sweden: RV Dana, Norway: RV G.O. Sars, Scotland: RV Scotia

Coordinating body is the ICES International Bottom Trawl Survey Working Group (IBTSWG).

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the IBTSWG. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: International Bottom Trawl Survey (IBTS) in the North Sea: German Coverage (Q1)

## **International Bottom Trawl Survey, Quarter 3 (IBTS Q3)**

### 1. Objectives of the survey

The main objective of the IBTS Q3 is to provide abundance indices of the target species haddock, cod, saithe, herring, sprat, whiting, mackerel and Norway pout in the North Sea and the Skagerrak. Germany participates as one of six nations in the internationally coordinated survey. Apart from abundance indices, information on individual length, weight and age is collected for the target species. Additional age data are obtained for selected fish species to be evaluated for future use in assessments (e.g. plaice). Furthermore, abundance, weight and length data are collected for all fish species caught. This serves the second objective to obtain information on changes in the distribution of fish species, in the composition of regional groundfish assemblages and on their biodiversity.

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

Types of data collected include biological data for the groundfish community, as well as additional data on the bycatch of benthic invertebrates. The German part of the survey includes a dedicated sampling programme of benthic epifauna and sediments. Further accompanying data recorded include information on stations and gear performance, hydrographic data, observations of weather and sea state. Additionally, quantitative observations of seabirds at sea are conducted. The data are stored locally in databases in the national institutes and submitted to public international databases at ICES. - A detailed description of the survey methods can be found in the corresponding survey manual:

<http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20%28SISP%29/SISP%2010%20-%20Manual%20for%20the%20International%20Bottom%20Trawl%20Surveys%20-%20Revision%20IX.pdf>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

UK England: RV Endeavour, Germany: FRV Walther Herwig III, Denmark: RV Dana, Sweden: RV Dana, Norway: RV G.O. Sars, UK Scotland: RV Scotia

Coordinating body is the ICES IBTSWG.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the IBTSWG. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



## North Sea Beam Trawl Survey (BTS)

### 1. Objectives of the survey

Target species of this survey are mainly sole and plaice but also associated species. The survey provides densities (abundance and biomass) indices for the target species as well as hydrographic data.

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

All surveys coordinated by WGBEAM are carried out with a beam trawl. Depending on the local circumstances and the ship's capacity, the width and rigging of the beam trawls varies. Germany uses a light 7.2 m beam trawl.

Manual: [http://www.ices.dk/marine-data/Documents/DATRAS%20Manuals/WGBEAM\\_Manual.pdf](http://www.ices.dk/marine-data/Documents/DATRAS%20Manuals/WGBEAM_Manual.pdf)

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

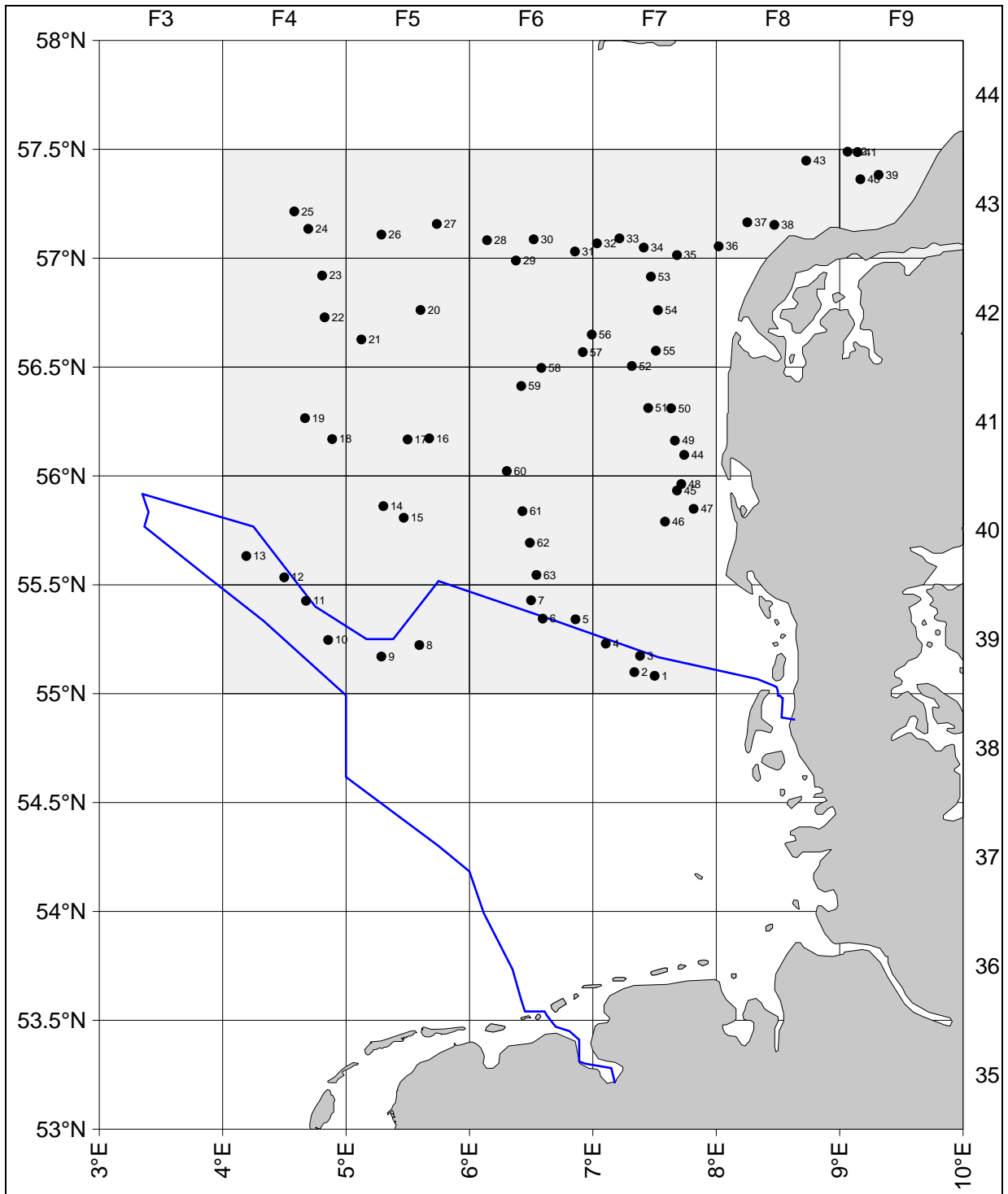
The Beam Trawl Survey in the North Sea and Eastern English Channel are carried out by Belgium, Germany, Netherlands and UK-Cefas.

The research vessels are BELGICA for Belgium, SOLEA for Germany, TRIDENS for The Netherlands and CEFAS ENDEAVOUR for the UK.

The survey planning group is the ICES WGBEAM.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by the WGBEAM. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: North Sea Beam Trawl Survey (BTS): Station plan

## Demersal Young Fish Survey (DYFS)

### 1. Objectives of the survey

The aim of the survey is to provide abundance indices of sole, plaice, whiting and cod as well as of other demersal young fish and brown shrimp. The indices are part of a time series which started in the early 1970's. The collected data are stored locally in a national data base and will be submitted to the ICES DATRAS. Data are used by ICES WGSSK, WGBEAM and WGCAN and are relevant to the trilateral Wadden Sea Monitoring Programme (TMAP). Comparable investigations are conducted by NED and BEL. The German part of the survey consists of short trips on chartered commercial cutters and the RV Clupea yearly in September/October.

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

Steel 3m-shrimp-beam trawl without tickler chain, 20mm codend. An electronic mini sensor for time, temperature and pressure (light optional) is attached. The whole catch is weighted and sorted, unless for the exceptional case of a very large catch, when only a sub-sample is processed. Length distributions are recorded for all finfish species caught, measured to the cm below. Herring and sprat are measured to the 0.5 cm. Survey manual:

<http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2015/01%20WGBEAM%20-%20Report%20of%20the%20Working%20Group%20on%20Beam%20Trawl%20Surveys%20%28WGBEAM%29.pdf>

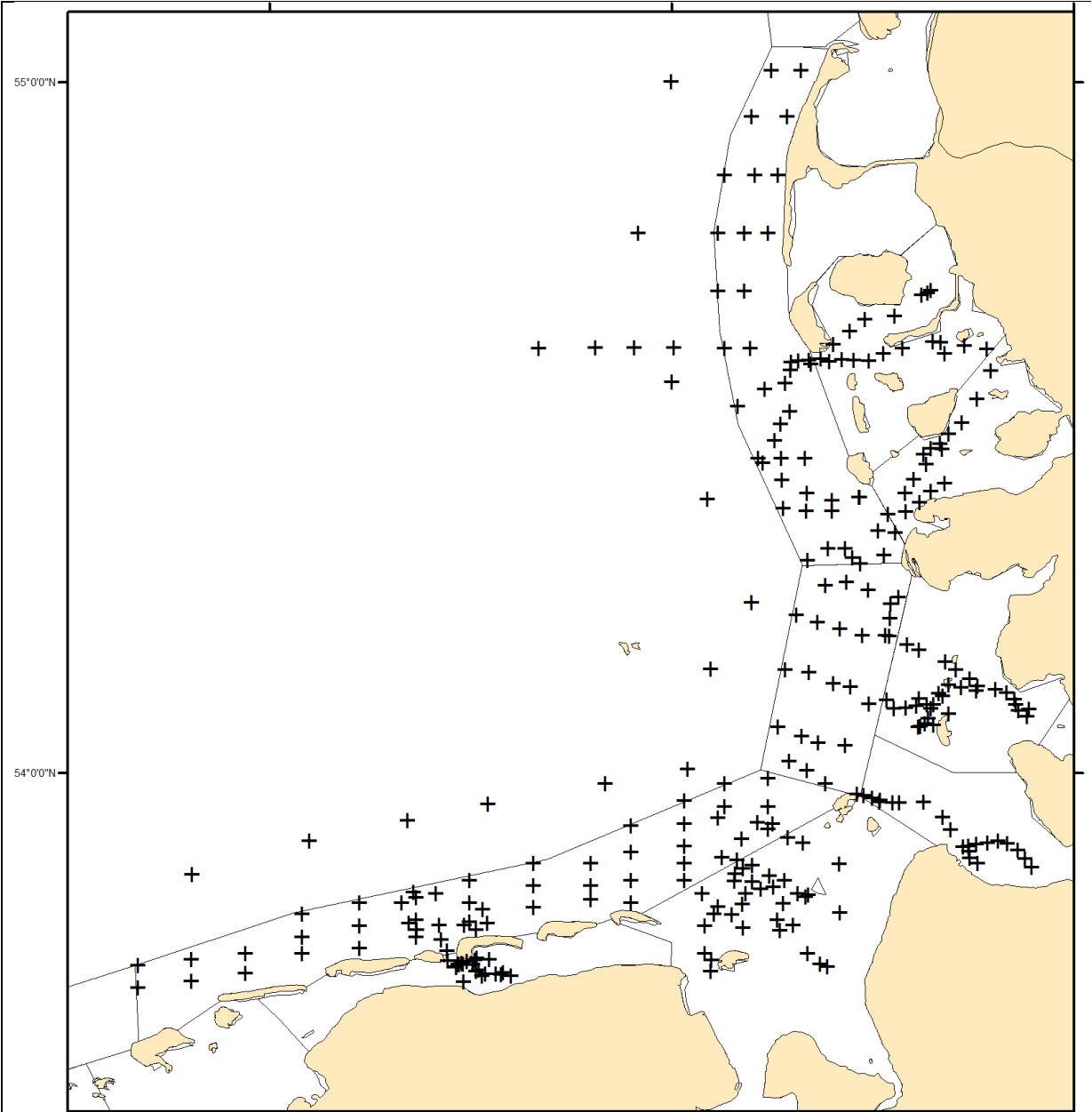
### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

This survey is coordinated by the ICES Working Group on Beam Trawl Surveys (WGBEAM). Participating countries are The Netherlands, Germany and Belgium. The Netherlands cover the area from the Dutch to the Danish coast with the RV Isis. In the Dutch Wadden Sea area, the RVs Stern and Waddenzee are used and the Scheldt Estuary is covered by the RV Schollebaar. Germany operates with chartered commercial shrimp cutters in the German Wadden Sea and operates along the German coast with the RV Clupea. Belgium operates along the Belgium coast with the RV Broodwiner. For further details, see the WGBEAM reports, e.g.:

<http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2015/01%20WGBEAM%20-%20Report%20of%20the%20Working%20Group%20on%20Beam%20Trawl%20Surveys%20%28WGBEAM%29.pdf>).

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGBEAM. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: Demersal Young Fish Survey (DYFS): Station grid

## International Herring Larvae Surveys (IHLS)

### 1. Objectives of the survey

The main objective of the survey is helping to assess the herring stocks in the North Sea. The results of the herring larvae surveys are used to calculate an overall biomass index of the SSB of North Sea autumn-spawning herring as well as the relative contribution of different stock components on the total herring reproduction. The surveys monitor the annual distribution and abundance of herring larvae at the main spawning locations, the length frequency of herring larvae, as well as ambient water temperature and salinity. All relevant herring larvae data are stored together with basic hydrographic information in the ICES eggs and larvae database. The surveys are conducted annually during autumn and winter.

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

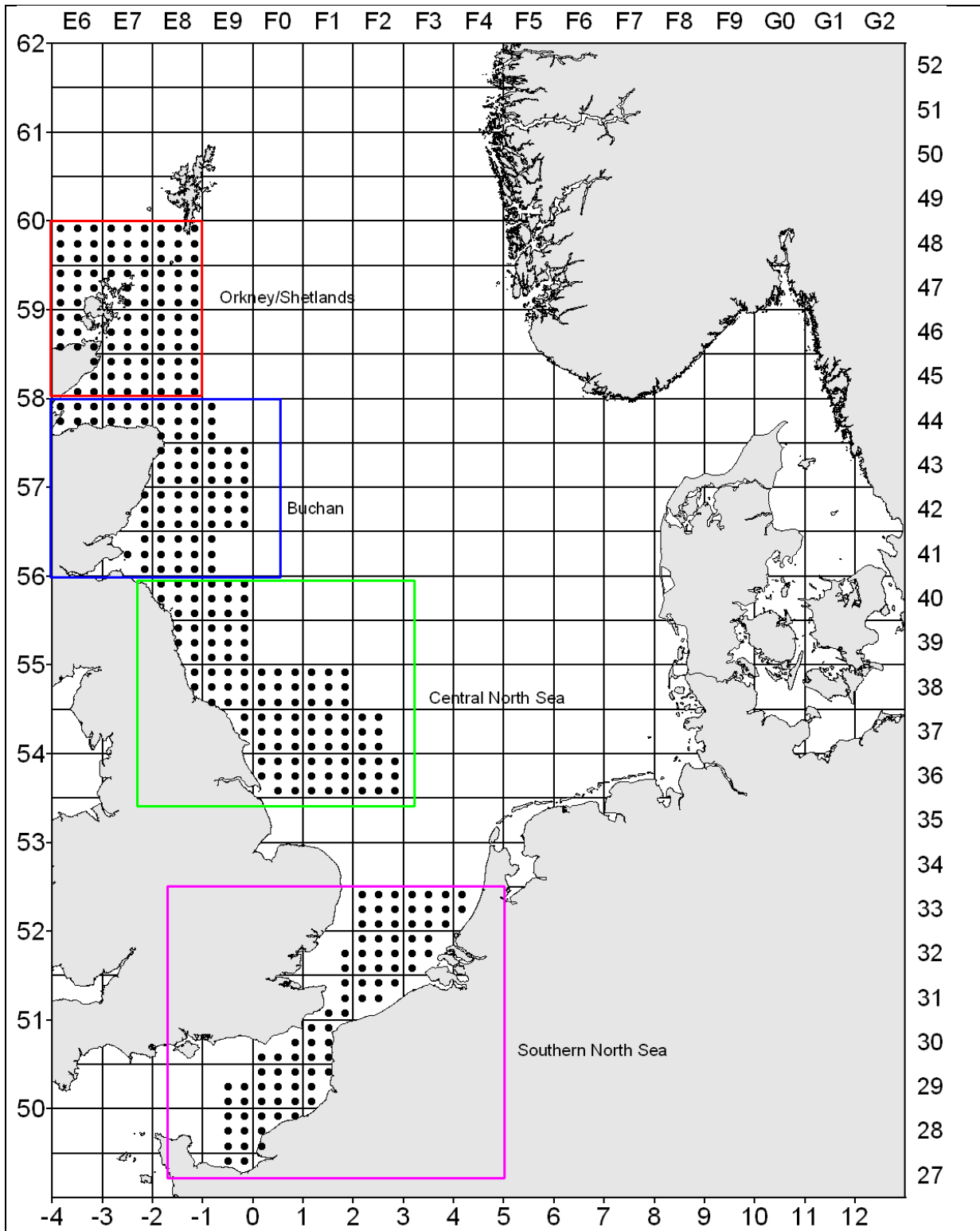
Herring larval abundance is surveyed at the major herring spawning grounds in the North Sea, e.g. in the Orkney/Shetland area, the Buchan region, the Central North Sea and the Southern North Sea. Standard gears are high-speed GULF samplers, deployed in a double oblique manner to near the sea bed and back to surface. Stations are located on a 10 by 10 nautical miles grid. This grid includes every square that is known to contain herring larvae less than 10 mm. Herring larvae are sorted from the samples and length-measured. The number of larvae per m<sup>2</sup> at each station is used to calculate mean numbers of larvae per m<sup>2</sup> for each ICES rectangle (consist of nine IHLS stations in total). These values are raised by the sea surface corresponding to the relevant rectangle and summed over the total area to obtain larvae abundance indices. The manual of the IHLS is available as Annex 7 to the ICES WGIPS Report 2010.

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Germany and The Netherlands participate in the IHLS sampling. With regard to the prevailing weather conditions, they most frequently use larger research vessels, e.g. FRV "Walther Herwig III" and RV "Tridens". The parental committee for the IHLS is the ICES Working Group on International Pelagic Surveys (WGIPS).

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGIPS. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: Herring Larvae Survey (IHLS) in the North Sea: Station grid

## North Sea Herring Acoustic Survey (NHAS)

### 1. Objectives of the survey

The survey aims to provide an annual estimate of the distribution, abundance and population structure to inform the assessment of the following herring and sprat stocks: Western Baltic spring-spawning herring (in ICES Divisions IV and IIIa), North Sea autumn-spawning herring (in IV, IIIa and VIIId), West of Scotland herring (in VIaN), Malin Shelf herring (west of Scotland/Ireland in VIaN-S and VIIb,c), North Sea sprat (in IV) and sprat in IIIa (Skagerrak/Kattegat). The derived estimates and age structure of herring and sprat are used as tuning indices in the respective assessments and are submitted annually to the ICES Herring Assessment Working Group (HAWG).

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

Types of data collected include 1nm NASCs for clupeid fish (acoustic data), age and length distribution for all clupeids in the investigation area, maturity at age. Survey manual:

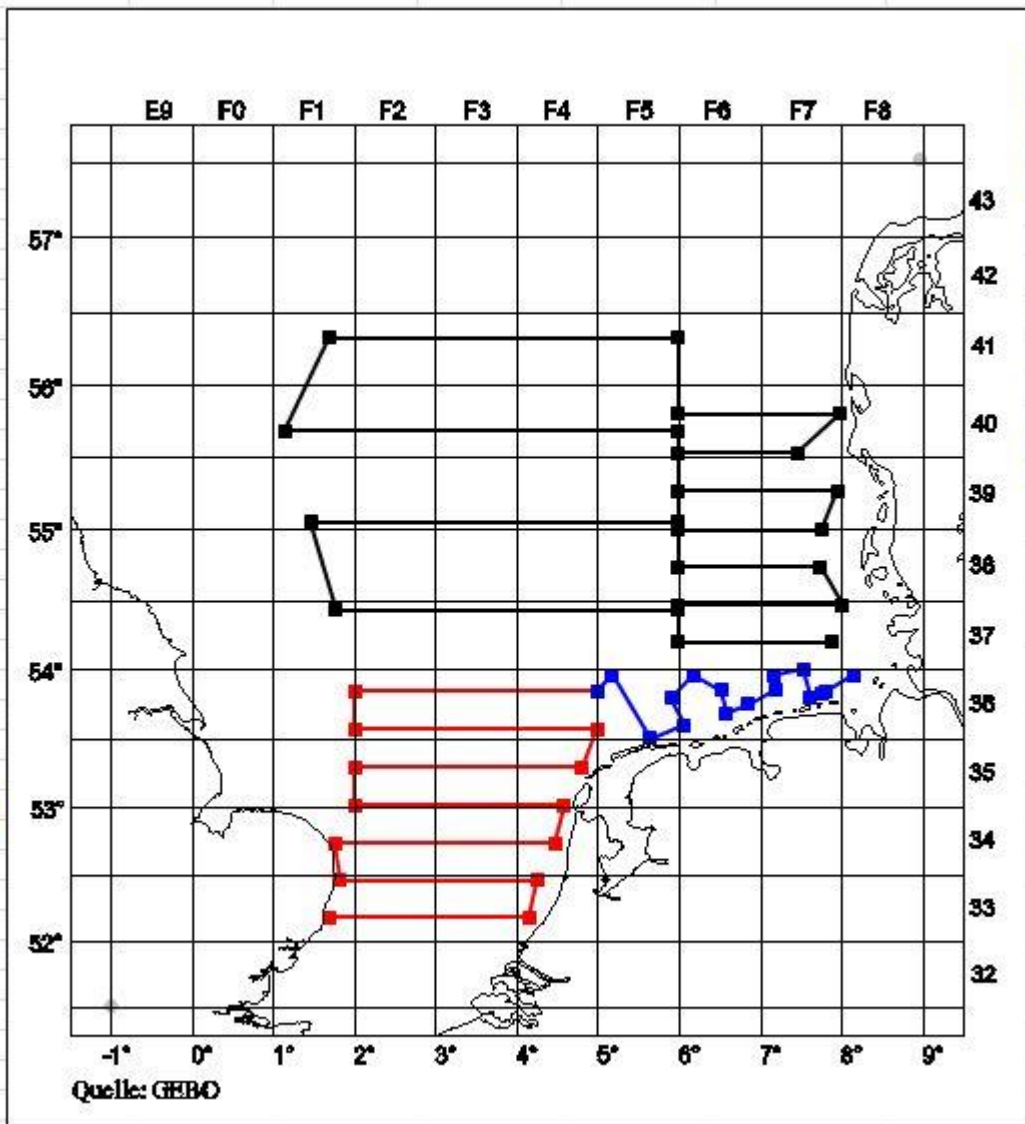
<http://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20%28SISP%29/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20%28IPS%29.pdf>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Participants (countries/vessels) of this internationally coordinated survey include: IRL (RV "Celtic Explorer"), SCO (RV "Scotia"), NOR (RV "Johan Hjort"), DEN (RV "Dana"), NED (RV "Tridens"), GER (FRV "Solea"). The survey is planned, coordinated and evaluated by the ICES Working Group on International Pelagic Surveys (ICES WGIPS).

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGIPS. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: North Sea Herring Acoustic Survey (NHAS): Cruise tracks

## International Redfish Trawl and Acoustic Survey (REDTAS)

### 1. Objectives of the survey

This cruise is part of a co-ordinated effort of ICES to undertake an International Deep Pelagic Ecosystem Survey in the Irminger Sea and adjacent waters in June/July, estimating the abundance and biomass of the pelagic beaked redfish (*Sebastes mentella*) stocks and conducting additional observations relevant to integrated ecosystem assessment in the area.

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

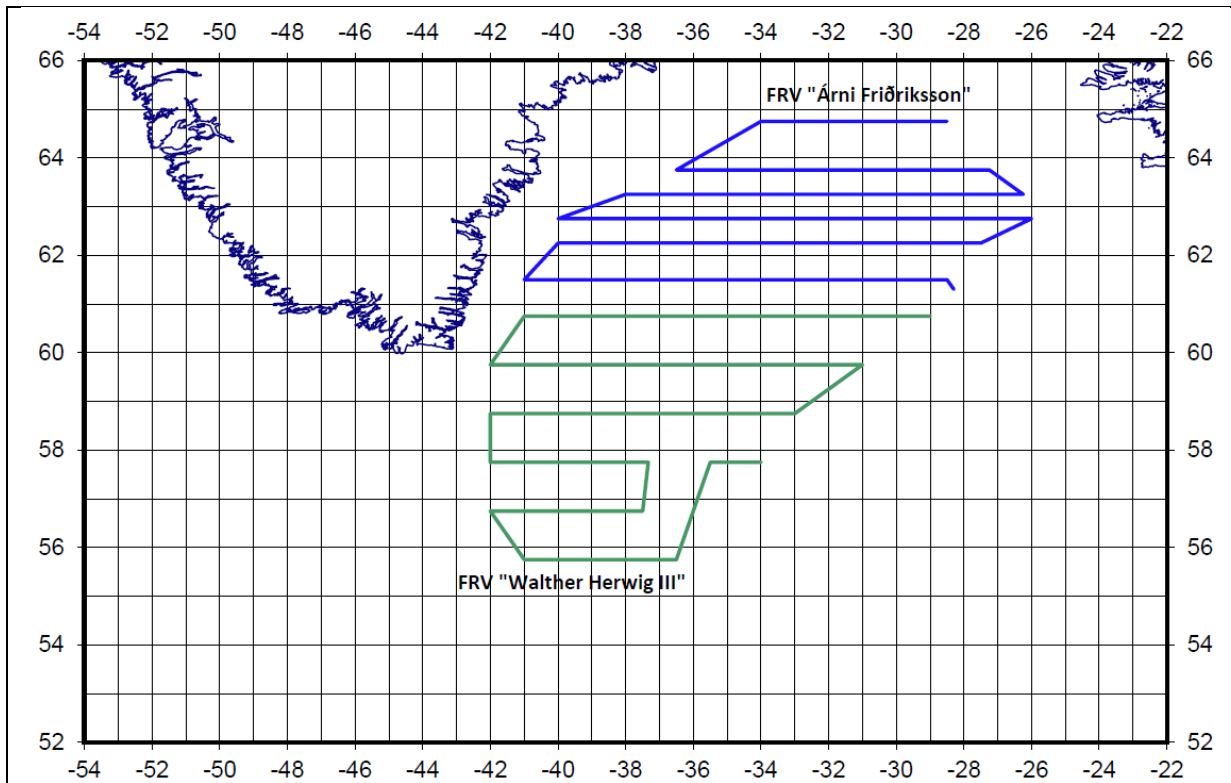
The international trawl/acoustic survey on pelagic redfish in the Irminger Sea and adjacent waters in June/July is carried out by three vessels from Germany, Iceland and Russia. In the depth zone that can be surveyed by hydroacoustic measurements, i.e. shallower than the deep-scattering layer (DSL; down to about 350 m), hydroacoustic measurements and identification trawls are carried out. Within and below the DSL (down to about 950 m), redfish abundance is estimated by trawls. Biological are collected from the redfish caught in the pelagic trawls and hydrographical measurements are taken on regular stations on the survey tracks. For details, see: <http://www.ices.dk/community/groups/Pages/WGIDEEPS.aspx>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

The survey takes place every three years and is scheduled to be a joint survey by Germany with the FRV “Walther Herwig III”, by Iceland (FRV “Árni Friðriksson”) and by Russia (RV “Vilnyus”). The main objective of the survey and the international co-operation of the survey are planned by the “ICES Working Group on International Deep Pelagic Ecosystem Surveys (WGIDEEPS – former name: Working Group on Redfish Surveys)” which usually meets late January/early February of the survey year.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGIDEEPS. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: International Redfish Trawl and Acoustic Survey (REDTAS): Hydroacoustic transects in 2015

## Greenland Groundfish Survey (GGS)

### 1. Objectives of the survey

The objective is to obtain data for the assessment of cod, demersal redfish and other demersal species in Greenland.

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

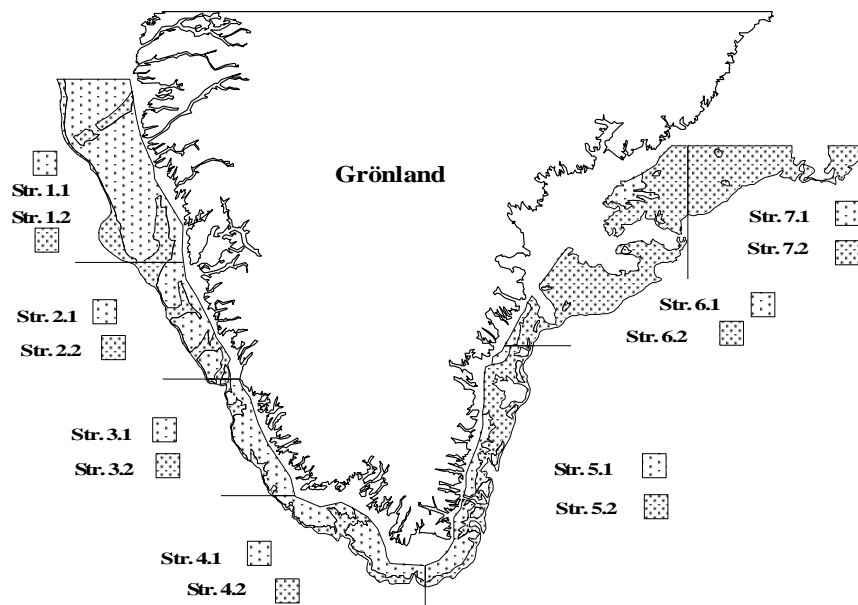
Demersal trawling, CTD casts and plankton sampling. Manual available at [www.thuenen.de](http://www.thuenen.de). The German groundfish survey started in 1982 and was primarily designed for the assessment of cod, but covers the entire groundfish fauna down to 400 m depth. It is carried out annually during the 4th quarter and provides the only fishery-independent information about the abundance & biomass of groundfish off Greenland (ICES Div. XIVb and NAFO Div. 1B-1F). Designed as a stratified random survey, the hauls are allocated to 14 strata (7 geographic areas \* 2 depth strata, 0-200m, 201-400m) off West and East Greenland. The fishing gear used is a standardised 140-foot bottom trawl. Biological data from the catches (length distributions for all species, individual weights, sex and maturity for the commercial species) are collected, raised to the total surveyed area and submitted to the ICES North-Western Working Group (NWWG) and NAFO Scientific Council and used in the respective stock assessments. In addition, hydrographic (CTD) and weather data are collected. The survey is carried out every October/November on FRV "Walther Herwig III".

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

The survey is regularly evaluated through ICES NWWG. DEU is the only EU Member State to undertake this survey. The current vessel used for the survey is FRV Walther Herwig III.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

No task sharing with other countries for the autumn survey. Greenland conducts a parallel spring survey with its own vessel. Data from the two seasons are combined in assessment.



Map: Greenland Groundfish Survey (GGS): Sampling strata

## **International Mackerel and Horse Mackerel Egg Survey (MEGS)**

### **1. Objectives of the survey**

The main objective of this triennial survey is to produce both an index and a direct estimate of the biomass of the North East Atlantic mackerel stock and an egg production index of the southern and western horse mackerel stocks.

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

The general method is to quantify the freshly spawned eggs in the water column on the spawning grounds and to determine the fecundity of the females. This is done by sampling sufficient numbers of gonads before during and after the spawning. These are then histologically analysed. In combination, the realised fecundity (potential fecundity minus atresia) of the females and the actual number of freshly spawned eggs in the water render an estimate of the spawning stock biomass.

Survey Manual: ICES 2014. Manual for the mackerel and horse mackerel egg surveys (MEGS): sampling at sea. Series of ICES Survey Protocols. SISP 6 - MEGS V1.3. 62 pp.

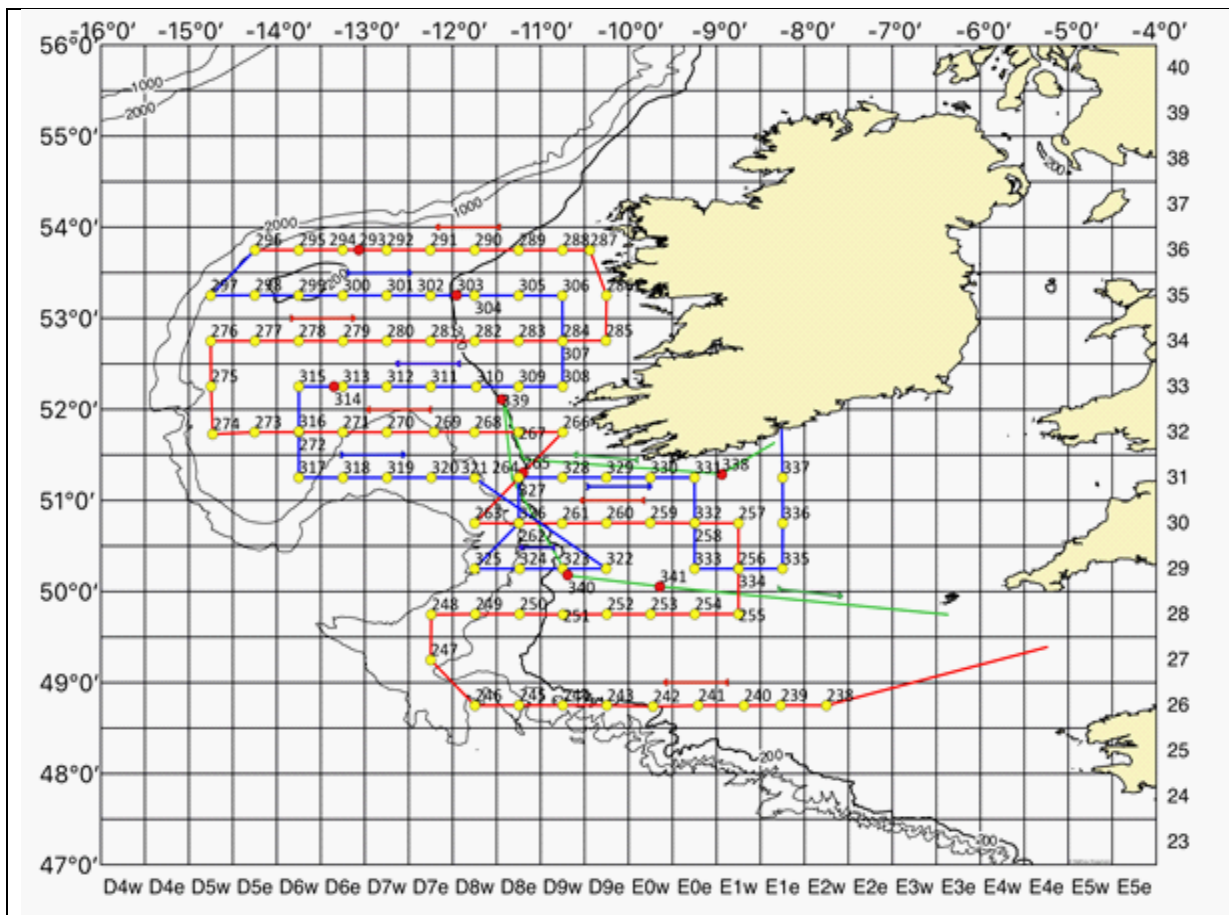
### **3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey**

Portugal: RV Noruega, Spain: RV Vizconde de Eza + RV Ramon Margalef + RV Emma Bardan (2016), The Netherlands: RV Tridens, Germany: FRV Walther Herwig III, Ireland: RV Celtic Explorer, Faroe Islands: RV Magnus Hendersson, Iceland: RV Bjarni Saemundsson; UK Scotland: RV "Scotia" plus chartered vessels

Coordinating body is the ICES Working Group on Mackerel and Horse Mackerel Egg Surveys (WGMEGS).

### **4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used**

Individual tasks to the survey participants (e.g. coverage of certain areas in a certain time frame) are allocated by WGMEGS. Each participating country is responsible for the activities conducted on its national part of the international survey. Cost sharing: There is no particular cost sharing agreement in place yet for this survey.



Map: International Mackerel and Horse Mackerel Egg Survey (MEGS): German Coverage 2016 (yellow circles = positions of plankton hauls; red = positions of fishing hauls)

## Non-mandatory surveys:

### Cod in the Baltic (CoBalt)

#### 1. Objectives of the survey

Target species is Baltic cod. The main aim is to monitor the reproductive activities of western and eastern Baltic cod. Target data are abundances, weight and length distributions of all fishes and length-weight-age-sex-maturity data of cod as well as hydrographic data (temperature, salinity and oxygen). The collected data are saved in a national SQL database. In addition, cod stomachs are sampled.

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

The used methods are standard BITS methods, which are described in the BITS survey manual:

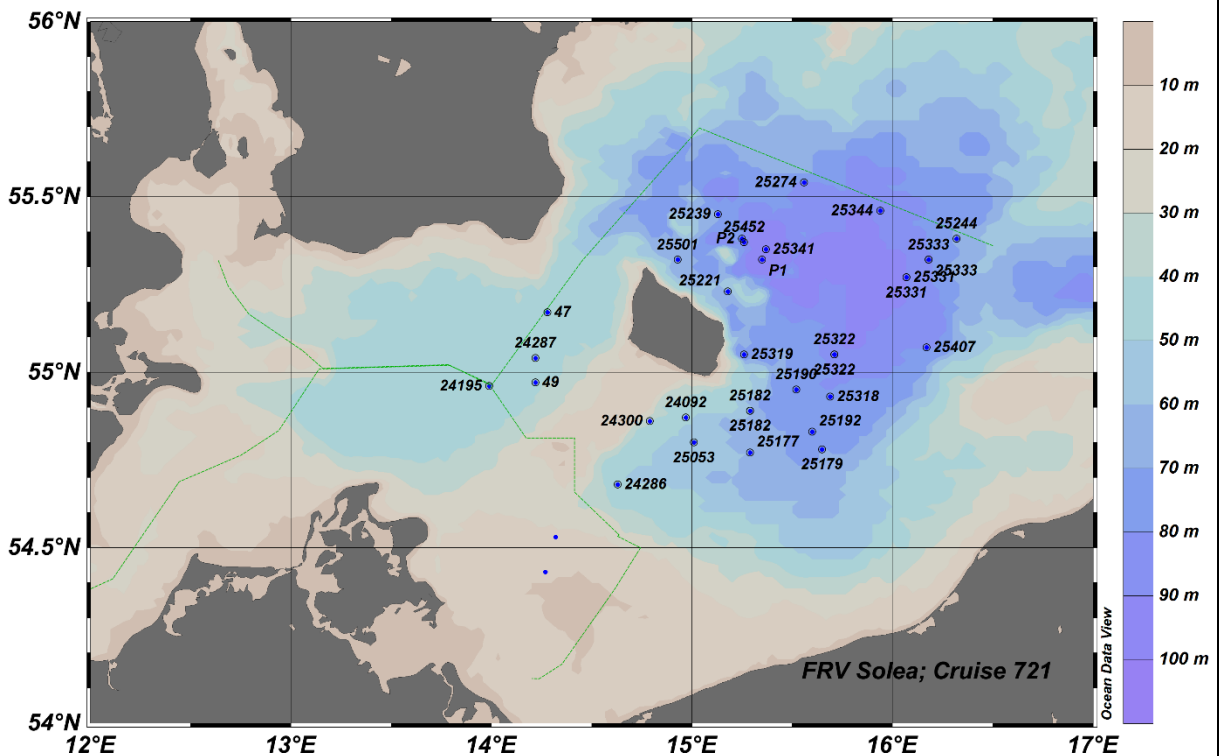
<http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

#### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

National survey only.

#### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only.



Map: Cod in the Baltic Survey (CoBalt): Positions of fishing hauls

## National Bottom Trawl Survey in the Baltic (BaltBox)

### 1. Objectives of the survey

Target species are demersal fish species. The main aim is the qualitative and quantitative recording of distribution and composition of the demersal fish fauna in the German EEZ of the Baltic Sea. Target data are abundances, weight and length distributions of all fishes and length-weight-age-sex-maturity data of Baltic cod, flounder, plaice, dab, turbot and brill as well as hydrographic data (temperature, salinity and oxygen). The data are saved in a national SQL database. In addition, cod stomachs are sampled.

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

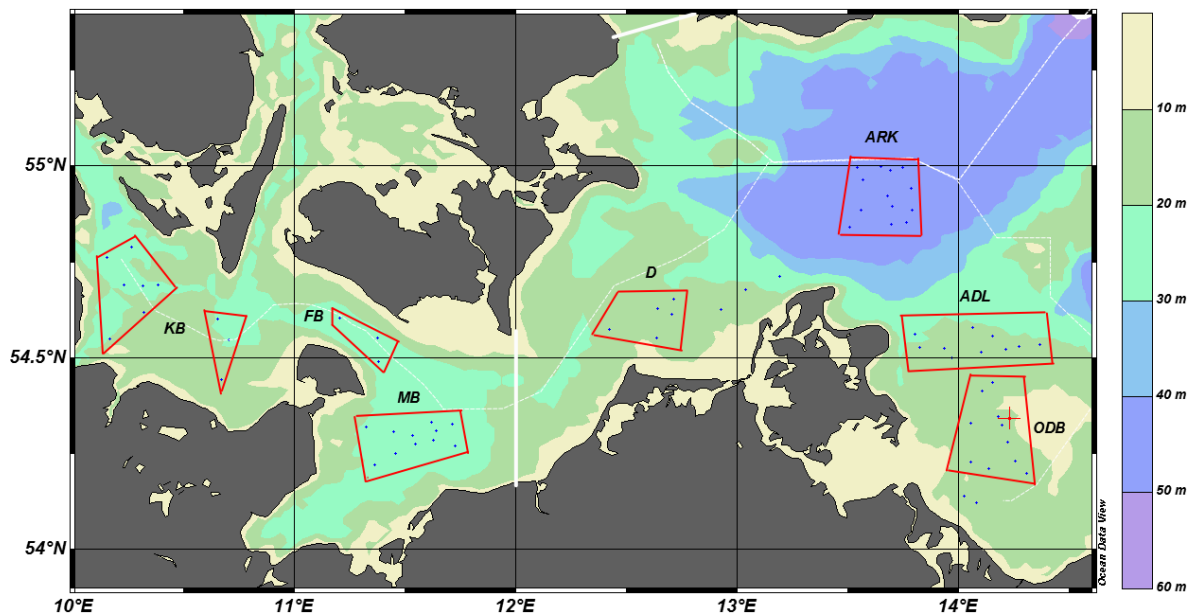
The used methods are standard BITS methods, which are described in the BITS survey manual:  
<http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

National survey only.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

-



Map: National Bottom Trawl Survey in the Baltic (BaltBox) June 2015: Station Plan with fishing boxes

## German Small-Scale Bottom Trawl Survey (GSBTS)

### 1. Objectives of the survey

The GSBTS is a national survey that is conducted once a year in the third quarter with high-frequency sampling of groundfish species within narrow spatial units (ca. 21 hauls within 10 x 10 nm rectangles, so-called "Boxes").

It is designed as a programme to complement the IBTS Q3 with information on small-scale processes (e.g. predator-prey interactions) and local distribution patterns and biodiversity measures on selected, typical North Sea habitats.

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

Types of data collected include biological data for the groundfish community, as well as additional data on the bycatch of benthic invertebrates. The GSBTS includes a dedicated sampling programme of benthic epifauna and sediments. Further accompanying data recorded include information on stations and gear performance, hydrographic data, observations of weather and sea state. Additionally, quantitative observations of seabirds at sea are conducted.

The data are so far stored locally in a national database.

For survey methods, see Ehrich et al. 2007. -20 years of the German Small-Scale Bottom Trawl Survey (GSBTS): A review. *Senckenbergiana maritima*. 37(1): 13-82.

For an evaluation of the survey, see ICES WKECES report:

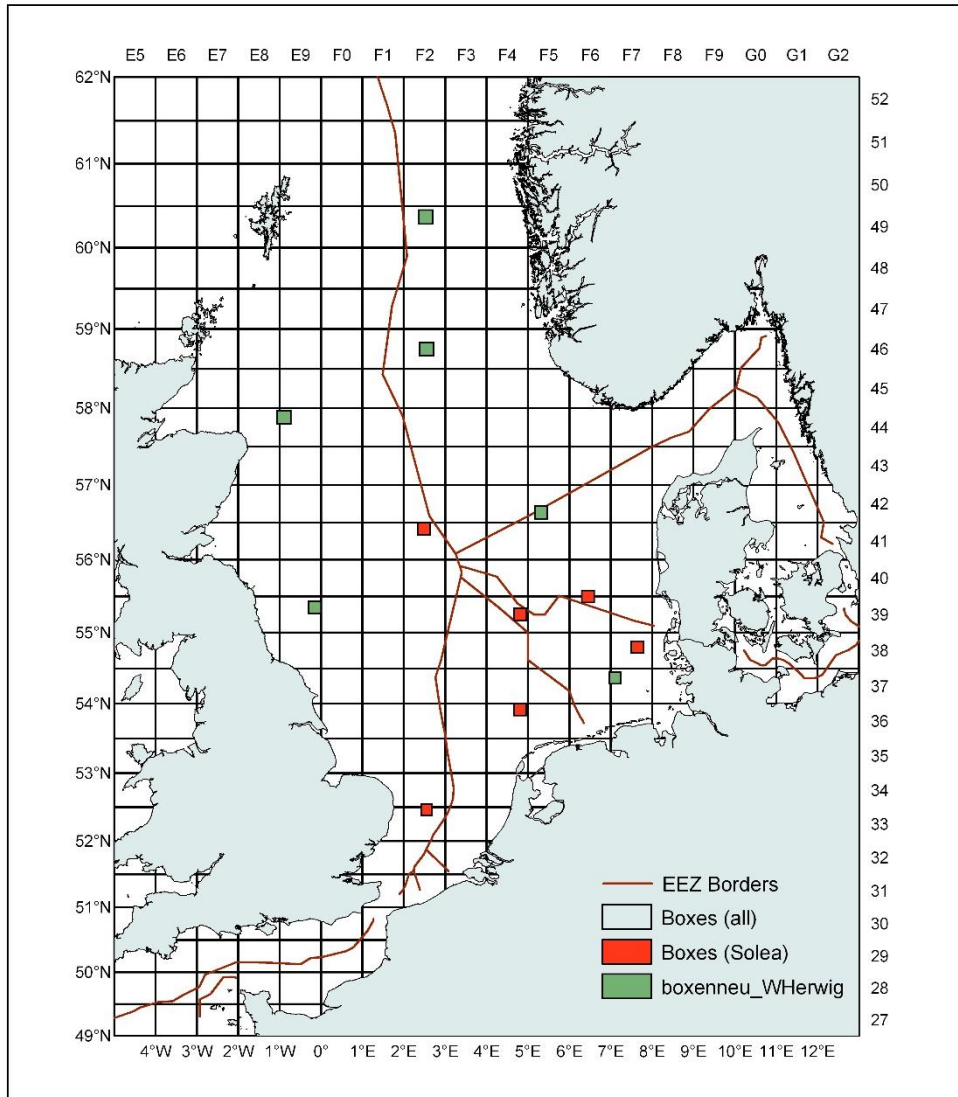
<http://www.ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGESST/2012/WKECES12.pdf>

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

At present, the GSBTS is conducted by Germany alone, although it covers habitats throughout the North Sea, in several national EEZs. It is the goal of the survey operators to turn it into an internationally coordinated survey which can provide information on biological processes necessary to support the assessment of fish stocks with knowledge about ecosystem functionality and ecosystem services.

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only



Mercator Projection (WGS 1984)

Map: German Small Scale Bottom Trawl Survey (GSBTS) – Positions of “Boxes”

## German Autumn Survey in the Exclusive Economic Zone (GAS EEZ)

1. Objectives of the survey
  - To determine the distribution and relative abundance of demersal fish species;
  - To monitor changes in the stocks of commercial fish species independently of commercial fisheries data;
  - To monitor the distribution and relative abundance of all fish species and invertebrates
  - To collect hydrographical data (temperature, salinity and oxygen);
  - To collect data on marine litter.
2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

The survey takes place every year alternately with beam trawl (7 meter) and otter bottom trawl (cod hopper). A fixed station pattern has been fished since 2004. Sorting of the catch follows the standard IBTS methods, which are described in the IBTS survey manual (ICES 2015: Manual for the International Bottom Trawl Survey, Revision IX. SISP 10).

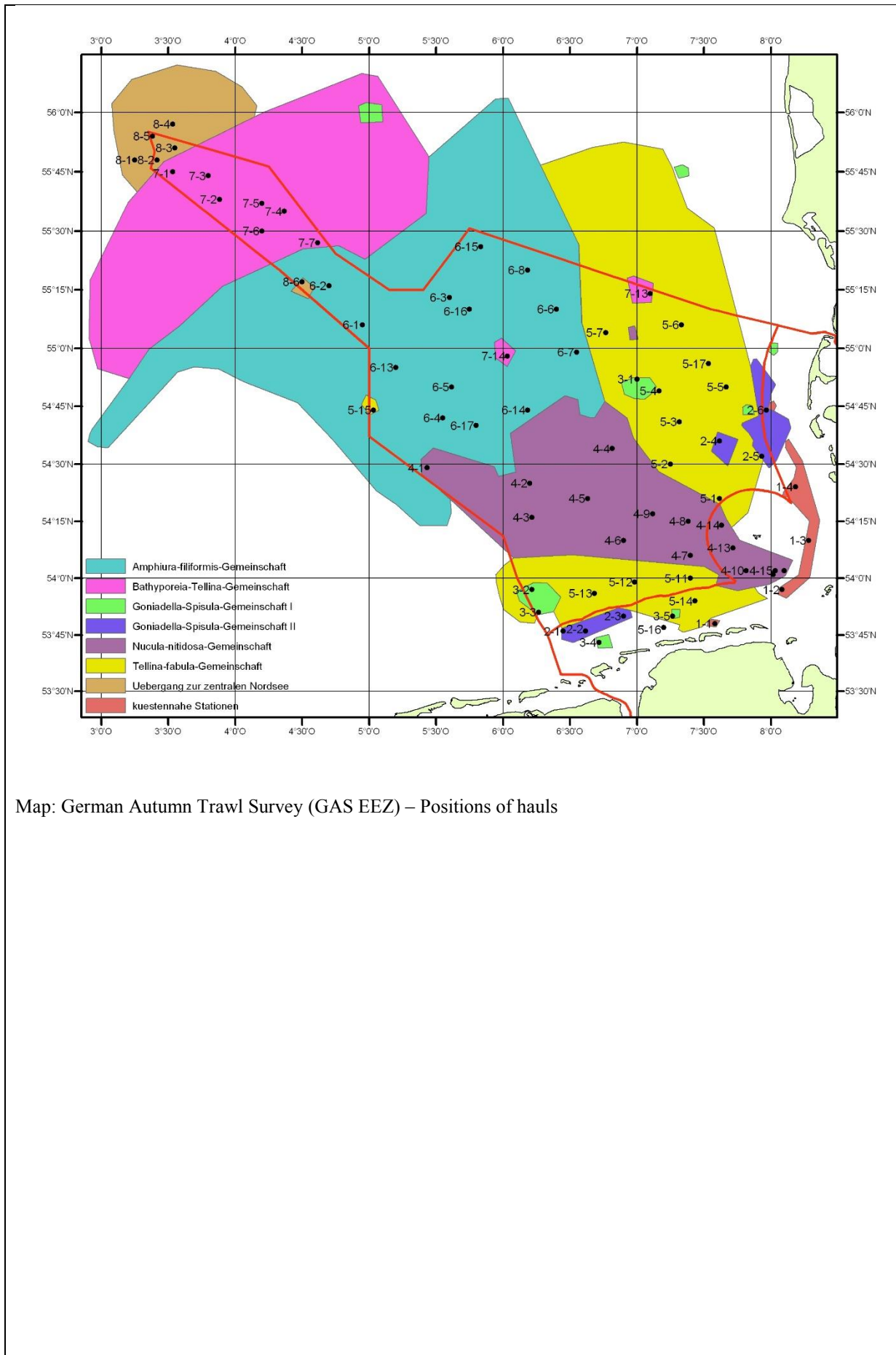
The data are so far stored locally in a national database.

3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

National survey only

4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only



Map: German Autumn Trawl Survey (GAS EEZ) – Positions of hauls

## Eel Larvae Survey

### 1. Objectives of the survey

A) Regular and standardized monitoring of larval eel (*Anguilla anguilla*) abundance in the Sargasso Sea as a basis for the establishment of a stock-recruitment relationship and stock assessment.

B) Larval abundance and distribution in the Sargasso Sea in relation to glass eel recruitment and hydrographic conditions in order to evaluate the effect of climate change on larval survival, retention and drift.

Data on larval abundance in the spawning area are poor and the existence of a stock-recruitment-relationship is unproven. Until today, European eel stock assessment is largely based on fluctuations in glass eel recruitment along European coasts. However, the age of arriving glass eels is scientifically disputed with estimations reaching between 1 and 3 years. In addition, oceanic factors influencing larval survival until metamorphosis into glass eel stages are still debated as potential drivers for the eel stock decline. The regular monitoring of larval abundance in the Sargasso Sea is aiming to provide information that is required to evaluate whether management measures (e.g. increase of spawner escapement) increase the reproduction success of *A. anguilla*. By comparing larval abundances with glass eel recruitment of the following years, the surveys also provide insights into the effect of oceanic factors on eel stock development. It is investigated how climatic changes affect the survival and distribution of eel larvae and to what extent the drift towards European waters might be impeded by hydrographic conditions.

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

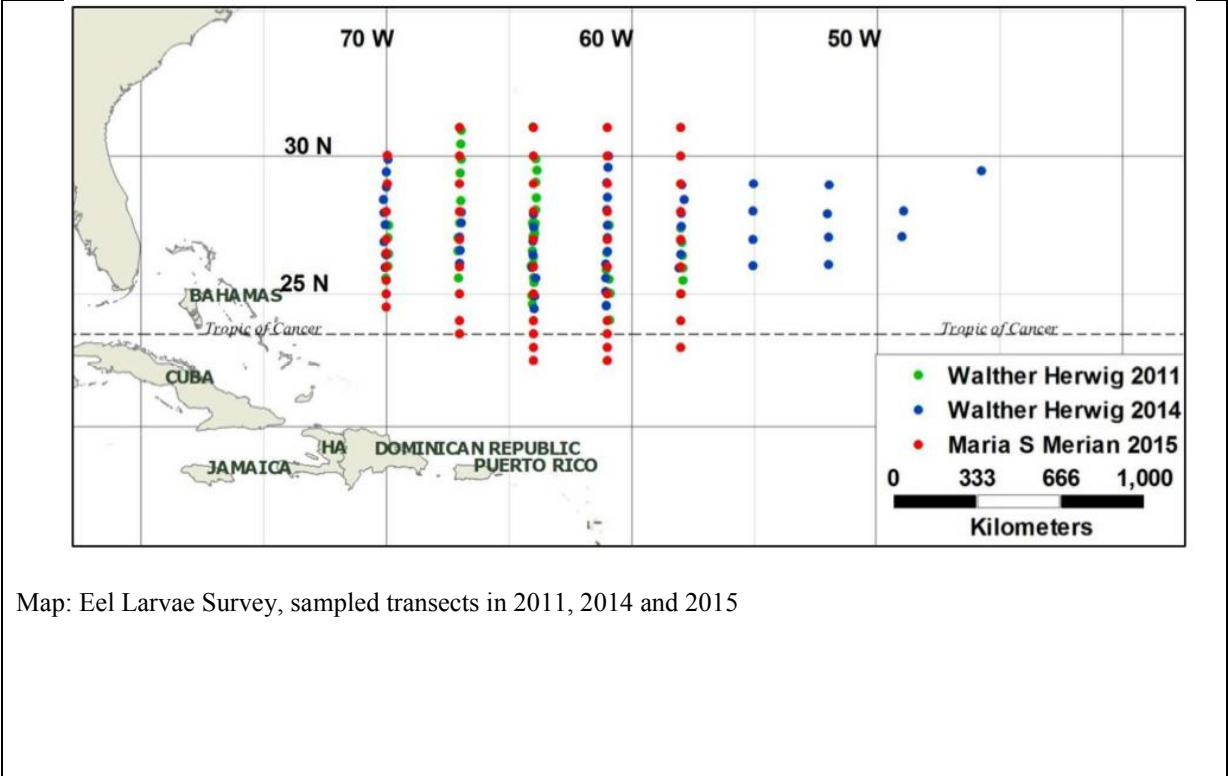
The study area ranges from 31° - 22°N and 70° - 50°W. Inside this area, a core sampling area is defined in accordance with larval distribution. Sampling takes place with an Isaac Kidd Midwater Trawl (net opening 6.3 m<sup>2</sup>, mesh size 500 µm) at approximately 50 stations along north-south transects. Species identification and length measurements of all leptocephalus larvae are done on board. Hydrographic conditions are monitored by CTD throughout the sampling area.

### 3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

National survey only

### 4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only



Map: Eel Larvae Survey, sampled transects in 2011, 2014 and 2015

## SECTION 2: FISHING ACTIVITY DATA

### **Text Box 2A: Fishing activity variables data collection strategy**

*General comment: This Box fulfills paragraph 4 of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of this Decision. It is intended to describe the method used to derive estimates on representative samples where data are not to be recorded under Regulation (EU) No 1224/2009 or where data collected under Regulation (EU) No 1224/2009 are not at the right aggregation level for the intended scientific use.*

#### **1. Description of methodologies used to cross-validate the different sources of data**

Depending on the variable, the source is either the logbook (for effort) or the sales notes (for value of landings). The logbooks are also used to determine the metier. There is, however, no duplicate provision of data from separate sources which would require cross-validation.

#### **2. Description of methodologies used to estimate the value of landings**

The value of landings is taken directly from sales notes. In the case of missing entries for the value, it is being estimated using prices achieved at the same time in the same region with the same gear at the same place. In the case of missing hits, the criteria of similarity (e.g. “same place”) are reduced until a hit is achieved.

#### **3. Description of methodologies used to estimate the average price (it is recommended to use weighted averages, trip by trip)**

Prices are estimated using figures from the sales notes. In order to get the price per kg, the revenue is divided by the mass sold. In the case of missing entries for revenue, it is estimated as described before.

#### **4. Description of methodologies used to plan collection of the complementary data (sample plan methodology, type of data collected, frequency of collection etc)**

For vessels without logbooks, effort variables are estimated on the basis of a questionnaire which is sent together with the survey on fleet economic variables (stratified random sampling). Gear size and days at sea are requested. These data are compared with the sales notes which always refer to a certain time period. The sum of these periods is related to the survey result. The ratio of both figures is used estimate the fleet segment total by multiplying it with the total of the time periods derived from the sales notes.

All other fishing activity data are collected according to the standards as provided by the Control Regulation (1224/2009).

## SECTION 3: ECONOMIC AND SOCIAL DATA

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

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

#### **1. Description of methodologies used to choose the different sources of data**

Data sources are chosen based upon availability and accessibility. Whenever data are available which are collected under a different legislation (transversal data), these are being used (fleet register, logbooks sales notes). Data which are not covered by the sources mentioned above, are collected through the following sources:

- i. an accountancy network which consists of about 160 vessels providing a comprehensive set of economic data annually (covering beam trawlers 12-24 m, demersal trawlers 12-24 m, and fixed netters between 8 and 18 m)
- ii. a questionnaire which is sent by mail to owners of small-scale fisheries vessels < 10m (“probability proportional to size” sampling), requesting “socio-economic” data on an enterprise level, and
- iii. a questionnaire for the segments “Beam trawlers: 10-12 m\*and 24-40 m\*”; “Demersal trawlers 24-40 m and >40 m” and “Pelagic trawlers > 40 m\*” referring to individual vessels.

All surveys are carried out on a voluntary basis. The selection under (ii) is related to the vessel owner. Most fishermen own only one vessel. In case that an owner is selected for sampling and owns more than one vessel, questionnaires will be sent for each individual vessel. However, fishermen owning more than one smaller vessel do not file expenses and employment data separated by vessel. Therefore, this group will be sampled on an enterprise basis, and only effort and physical value data will be surveyed on a vessel basis.

#### **2. Description of methodologies used to choose the different types of data collection**

Methodologies are chosen by means of segment size and importance. Segments with few vessels, but high importance for certain fisheries or in terms of total landings, are sampled exhaustively. This applies to most segments >24m. Other segments are sampled on the basis of “probability proportional to size” sampling (“size” refers to the value of landings). The bigger the segment (in terms of no. of vessels), the smaller the sample rate.

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

The sampling frame is the target population. The target population is the fleet on 31<sup>st</sup> December plus all vessels having reported any activity (landings declaration) during the year. Vessels are allocated to a segment gear by using logbook information or, for vessels without logbooks, main gear in the fleet register.

As approved for previous periods, vessels targeting mainly blue mussels are excluded from the fishing fleet, as their activity is defined as aquaculture (using seed mussels) and their figures are reported in the aquaculture section.

#### **4. Description of methodologies used for estimation procedures**

A correlation analysis is being performed between data which are available exhaustively (capacity, landings, and in most cases effort) and those data from the surveys. The Pearson correlation coefficient is used as a first indicator of which factor has the most influence on the variable which has to be estimated. As a result of this

analysis, a scheme is being developed, which includes not only correlation aspects, but also considerations of meaningfulness. For instance, energy costs are likely to be dependent upon both the vessel size and some effort parameter, but not so much on value of landings – even if the correlation analysis might indicate something else.

<i>Variable type to be estimated</i>	<i>Basis for estimation</i>				
	GT	kW	fishing days	days at sea	value of landings
Direct subsidies		X			
Other income		X			
Wages and salaries of crew	X		X		X
Imputed value of unpaid labour	X		X		X
Energy costs	X		X		
Repair and maintenance costs	X				X
Variable costs	X		X		
Non-variable costs	X	X			
Investments in physical capital					X
Debt/asset ratio					X
Engaged crew				X	
FTE National				X	

#### *Estimation for segments with sampling results*

In a next step, the values are estimated for the segment for which sampled data are available. It has turned out that the fractions, which the sample represents within the considered segment, are in most cases quite similar, e.g. in TBB1218 the sample represents about 41% of the number of vessels, 41% of LoA, 44% of GT, 41% of kW, 52% of weight of landings, 49% of revenues and 45% of days at sea (example from 2008).

In other words, estimations are in most cases quite robust, no matter which factor is used for estimation. Nonetheless, the estimator is chosen with respect to the scheme above. In cases where more than one variable is indicated as basis for estimation, the average of the fraction will be applied.

#### *Estimation for segments without sampling results*

According to the experience in previous years, there is a chance that for a segment or a variable no responses are obtained. In this case, the basis for estimation will be a regression analysis of segments with the same fishing technique and an adjacent length class or with the same length class and a similar fishing technique, depending upon which version delivers the highest  $r^2$ . The final choice can be done only when the data are available.

### **5. Description of methodologies used on data quality**

In accordance with the STECF report on quality aspects (SGECA 09-02), the coefficient of variation will be used as indicator of accuracy.

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Pilot Study 3: Data on employment by education level and nationality**

*General comment: This Box fulfills paragraph 5 point (b) and paragraph 6 point (b) of Chapter III of the multi-annual Union programme and Article 2 and Article 3 paragraph (3) point (c) of this Decision. It is intended to specify data to be collected under Table 6 of the multi-annual Union programme.*

#### **1. Aim of pilot study**

The aim of the pilot study is to investigate the opportunities to collect the requested data, find out to which extent and at which resolution level the requested data can be determined and to find out to which extent the data which are available through other sources (Federal Employment Office, Employer's Liability Insurance Association) fulfil the requirements and which additional information is required.

#### **2. Duration of pilot study**

6 months

#### **3. Methodology and expected outcomes of pilot study**

The expected outcome of the pilot study is comprehensive information on extent and resolution of availability of requested data through existing sources (Federal Employment Office, Employer's Liability Insurance Association). It will be scrutinised which additional information will be required to assign these figures to fleet segments.

Methods will comprise requests via e-mail, phone interviews and mail survey.

## SECTION 3: ECONOMIC AND SOCIAL DATA

### **Text Box 3B: Population segments for collection of economic and social data for aquaculture**

*General comment: This Box fulfills paragraph 6 points (a) and (b) of Chapter III of the multi-annual Union programme and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of this Decision. It is intended to specify data to be collected under Tables 6 and 7 of the multi-annual Union programme.*

**Background:** German aquaculture farms produced 26,900 tons of fish, crustaceans, molluscs and other aquatic organisms in 2015 (Destatis 2016). The main species are rainbow trout, common carp and blue mussels. According to the last tentative assumed Eurostat aquaculture production data, this represents a share of 2.1 % of the total EU-28 production (Eurostat 2016). Taking into account the defined thresholds of the EU MAP (Implementing Decision 2016/1251, chapter V 6.), social and economic data on aquaculture will be collected, while environmental data on aquaculture will not be collected.

#### **1. Description of methodologies used to choose the different sources of data**

The Federal Statistical Office in Germany (Destatis) coordinates an annual aquaculture census on production data (volume, species, number of farms, used fish farming technique per federal state). These data do not provide further economic facts on aquaculture. Notwithstanding, it can be seen as a starting point for a planned evaluation on economic and social performance of the sector. Further, the German Federal Employment Agency (ARGE) collects monthly data on employment. The ARGE only distinguishes between “German employee” and “Non-German-employee” without differentiating between the nationalities. Regarding the current data situation and the requirements of DCF, there are two different data resources to analyse the economic and social performance of the sector: established secondary data (data on employment and production) and planned survey on economic and social data. For marine aquaculture, data from landing statistics are available. Missing social and economic variables are collected by personal interviews, telephone calls and written questionnaire.

#### **2. Description of methodologies used to choose the different types of data collection**

A report about the organisation of the survey, its various segments and the quality aspects of data will be provided. The required economic data for the freshwater aquaculture will be addressed by one type of data collection: survey. For the marine aquaculture, landing statistics will also be used.

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

The German freshwater aquaculture is a small business sector including 3,269 fish farms (Destatis 2016). Fish farms in Germany mainly produce trout (rainbow trout, brown trout, brook trout) and common carp. Trout and carp farms accounted for 82 % of the total German freshwater aquaculture production and covering 98 % of fish farming systems used in 2015. Own estimations lead to a volume share of at minimum 70 % of the total value of domestic freshwater aquaculture commodities in Germany. Other species count for <10 % of the sector’s volume and value. Out of the 3,269 fish farms, only 456 farms produced >5 t in 2015, which represent 11 % of the all fish farms, but which supply 89 % of the total freshwater production (Destatis 2016). Considering the structure of the sector and the requirements under the DCF, fish farms >5 t determine the population frame (N=456). Only their operations can be considered as fish farms “whose primary activity is [are] defined according to the European classification of economic activities” (Decision 2016/1251, Chapter III 6.a).

The data collection will use a two-stage sampling process. First, a cluster sample will be applied, which

includes six of the 16 federal states of Germany (Baden-Württemberg, Bavaria, Lower Saxony, North Rhine-Westphalia, Saxony and Brandenburg). These federal states represent 81 % of the total trout production and 87 % of the total carp production in Germany. Inside the chosen cluster, a probability sample survey with a planned sample rate of 30 % of trout and carp farms >5 t will be considered. For the marine sector, all approx. 10 companies holding licenses are surveyed by questionnaire.

#### **4. Description of methodologies used for estimation procedures**

For production and for some social variables, there is no estimation necessary (cf. point 1.), as the data are based on a census. In case of economic data gained via sample (cf. point 3), standard statistic parameters will be applied within the true population to a certain degree of confidence (cf. point 5 “sampling errors”).

#### **5. Description of methodologies used on data quality**

The quality of available data can be regarded as high due to the fact that Destatis’ data on aquaculture and ARGE’s data on employment are conducted via census. Destatis sets thresholds, which exclude fish farms with a scale <0.3 ha or with a volume <200 m<sup>3</sup> (Destatis 2016). These excluded ca. 2,000 smallest scale farms, accounting for only 0.8 % of the German freshwater aquaculture production. The planned two-stage sample for DCF economic data on freshwater aquaculture, whose primary business activity is aquaculture, follows the common practices of statistics with linked sampling errors. The sampling errors will be expressed by standard error, coefficient of variation and confidence interval. Due to the experience of the Thünen Institute regarding economic surveys for fisheries and (marine) aquaculture and an internal review process of the development of a well understandable questionnaire, measurement errors are not expected. Economic data collection is not mandatory for fish farmers in Germany. Thus, a low response rate is considered. As a consequence, a focus of data collection will include communication strategies in advance (announcements in fish farmer magazines, personal introduction of the project to local research stations and fish farmer meetings) as well as mail reminders.

#### ***References***

ARGE (2016) Sozialversicherungspflichtig Beschäftigte nach ausgewählten Wirtschaftszweigen der WZ 2008. German Federal Employment Agency, internal report, Nürnberg, July, 2016.

Destatis (2016) Land- und Forstwirtschaft, Fischerei. Erzeugung in Aquakulturbetrieben 2015. German Federal Statistical Office (Destatis), Fachserie 3 (4.6), Destatis, Wiesbaden.

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Eurostat (2016) Total production of fish, crustaceans, molluscs and other aquatic organisms from aquaculture ("fish-farming") from 2008 onwards, excluding hatcheries and nurseries. Online source, 18 Oct 2016 <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=de&pcode=tag00075&plugin=1>

### SECTION 3: ECONOMIC AND SOCIAL DATA

#### **Pilot Study 4: Environmental data on aquaculture**

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

*No data collection planned due to threshold (see background text at the beginning of Text Box 3B).*

## SECTION 3: ECONOMIC AND SOCIAL DATA

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

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

#### **1. Description of methodologies used to choose the different sources of data**

In Germany, the fish processing sector is part of the industry. Almost 80-90% of employment and turnover belong to companies with 20 and more employees. Therefore, already existing data collection schemes with the emphasis on these larger companies are used. Additional data in particular for the social variables are gathered by the Federal Employment Agency. These data are almost all based on census. In order to avoid doubling data collection, these primary data are used for the purpose of the data collection in the processing sector. For some variables, data are not available via other administrative bodies. In these cases, the Institute of Sea Fisheries conducts an additional survey and will make also use of published financial statements of the companies.

The Federal Statistical Office in Germany (Destatis) holds a database with data on turnover, number of enterprises and employees belonging to the social security scheme. Destatis further collects data on Investment and sales on a census basis with a threshold of companies with 20 employees and conducts a probability sample survey on several cost items and employment data.

The Federal Employment Agency registers all persons employed in Germany. Additional characteristics like gender, age etc. are collected as well. If data on employment figures are not sufficient or - as in the case of unpaid labour – maybe not fully covered by the Employment Agency, additional data collection on a triennial basis for social data and annually for economic data will be executed by the Institute of Sea Fisheries.

For the raw material input by species and origin, some experience in data collection exists at the institute from former years. In order to enhance quality, a pilot study will be conducted. The aim is to make use of data already stored for traceability purposes in the sector. It is intended to check the quality and availability of these data and eventually conduct an own survey to obtain reliable pictures of the raw material input by species and origin. Meetings with industry representatives will form the starting point.

#### **2. Description of methodologies used to choose the different types of data collection**

The already existing data collections by the Federal Statistical Office and the Federal Employment Agency are well established and provide reliable and validated time series. Respective quality reports are available on request or already on the respective websites. A report about the overall description of the organisation of the survey, the various segments, and the quality aspects of both data types - primary and secondary data - will be provided. Given the experience from former years, data on variables that are not covered by other administrative bodies are more or less well achievable by questionnaire and eventual telephone recall, so this methodology will be maintained.

For the volume of raw material by species and origin, no such regular collection scheme is established, so a pilot study will be conducted.

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

In many cases, where data are already covered by regular data collection, decision on sampling frame and allocation scheme have been made already years ago, e.g. on the European level for Structural Business Statistics (SBS) data, or census is conducted.

For the data collection conducted by the Institute of Sea Fisheries, the principles are cost effectiveness and avoiding double data collection burden for the enterprises. On the other hand, the requirement is to obtain reliable data representing development and status quo of the sector. So a sampling frame concentrating on the large companies with 20 and more employees (representing 80-90% of the sectors turnover and employment) will be set up, and together with published financial statements, 20% sampling rate seems to be appropriate.

#### **4. Description of methodologies used for estimation procedures**

For some economic data and for some social variables, there is no estimation necessary because data are based on census and past experience shows no problems with non-response. In case of economic data gained via sample (cf. Table 3C), standard statistic parameters will be applied to calculate the range of values/volumes within the true population.

For the pilot study on raw material volume, the procedure to estimate sector totals will depend on the result of the planned study, whether full data sets are available or estimation is necessary and meaningful.

#### **5. Description of methodologies used on data quality**

The quality of available secondary data can be regarded as very high due to the fact that Destatis' data on fish processing industry are collected under European SBS standards and ARGE's data collection on employment is conducted via census. Destatis sets thresholds for specific cost data (20 and more employees, cf. Table 3C for details), but the stratified random sampling covering around 40% of the sectors larger companies allows high quality of the data. Due to the experience of the Thünen Institute regarding economic surveys for fisheries, (marine) aquaculture and fish processing, measurement errors are not expected. Some data are collected by the Institute of Sea Fisheries (cf. Table 3C), including the pilot study on raw material. As answering to this questionnaire is not mandatory for the companies, a low response rate is considered. As a consequence, a focus of data collection will include communication strategies in advance (announcements in fish sector magazines, personally introduction of the project to the association of fish processors) as well as mail reminder. Quality will be assessed by response rate and the sampling errors will be expressed by standard error and coefficient of variation.

#### ***References***

ARGE (2016) Sozialversicherungspflichtig Beschäftigte nach ausgewählten Wirtschaftszweigen der WZ 2008. German Federal Employment Agency, internal report, Nuernberg, July, 2016.

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Destatis (2016) Kostenstruktur der Unternehmen des Verarbeitenden Gewerbes, Fachserie 4 Reihe 4.3 – 2014  
Destatis, Wiesbaden.

**Text Box 4A: Sampling plan description for biological data**

*General Comment: This Box fulfills Article 3, Article 4 paragraph (4) and Article 8 of this Decision and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multi-annual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multi-annual Union programme.*

**General remark**

Germany is conducting two approaches for the North Sea / North Atlantic (Institute of Sea Fisheries, Hamburg) and the Baltic Sea region (Institute for Baltic Sea Fisheries, Rostock) to account for the nature of the fisheries in the different regions.

**a) North Sea / North Atlantic regions:**

Table 4C lists all fleet segments operating in the North Sea and North Atlantic regions with average landings >100t per year. Overall, approx. 220 vessels are operating in these regions, the majority belonging to the brown shrimp fleet. All other segments operating in the North Sea and North Atlantic consist of only a few vessels (on average 2 to 5 vessels). The same vessels can be listed in more than one segment. For instance, the same pelagic trawlers are targeting North Sea herring or blue whiting in ICES Div. VIb depending on the season.

The sampling frames for biological data are described in Table 4B. Vessels to sample are selected from a telephone list. However, the approach is an opportunistic randomised PSU selection and not fully probability-based due to the low number of vessels within one segment. The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

The only fleet segment with a greater number of vessels is the brown shrimp fishery, yet the target species is not assessed by ICES and there is no TAC. Some segments in the high-seas fisheries might consist only of one trip of a three-month duration by a huge vessel and high catch leading to a nearly exhaustive sampling of the segment.

Overall, the sampling frame is designed to fulfil the sampling obligations according to Table 1A and to understand the catch compositions of the important fisheries in these regions qualitatively and quantitatively as well as to enable and secure the data delivery to the assessment groups. Adaptations to the selected fisheries will be carried out after regional work plans and/or agreements have been established.

For the North Sea and North Atlantic, sampling is undertaken by at-sea-sampling only. This is because in the harbours of the German North Sea coast, there are hardly any auctions and direct fish sales. Landings are directly transferred from the vessel to different processing plants in Germany, but also to processing plants in foreign countries. Overall, 68%, 64% and 70% of the German landings occurred in foreign countries in 2013, 2014 and 2015, respectively. Therefore, it is virtually impossible to sample at harbours.

Sampling strata by regions:

## 1) North Sea and Eastern Arctic

Fishing ground: Eastern Arctic (ICES Sub-areas I and II)*Arctic 1 – (Factory trawlers)*

Target species: Saithe and cod. Peak season: 1<sup>st</sup> and 3<sup>rd</sup> quarter. Area: Northeast Arctic waters. Duration of trips: 4 weeks to 3 months.

*Arctic 2 - (Pelagic freezer trawlers)*

Target species: Atlanto-Scandian herring. Peak season: August to November. Area: Norwegian Sea. Duration of trips: 3 to 4 weeks.

Fishing ground: North Sea and Skagerrak (ICES Sub-area IV and Divisions IIIa and VIId)

*North Sea 1 – (Small beam trawlers)*

Target species: Brown shrimp. Peak season: March to October with peaks in the 2<sup>nd</sup> and 3<sup>rd</sup> quarter. Area: German North Sea coastal waters. Duration of trips: 1 to 3 days.

*North Sea 2 – (Pelagic freezer trawlers)*

Target species: Herring, mackerel. Peak season: Restricted fishing season for mackerel in the North Sea – January/February and 4<sup>th</sup> quarter; Herring – 3<sup>rd</sup> quarter/December. Area: North Sea and English Channel. Duration of trips: 3 to 4 weeks.

*North Sea 3 – (Otter trawlers, pair trawlers and seine trawlers)*

Target species: Saithe, cod, haddock. Peak season: All year round. Area: Northern North Sea and Skagerrak. Duration of trips: 1 to 2 weeks.

*North Sea 4 – (Beam trawlers)*

Target species: Sole and plaice. Peak season: All year round. Area: Southern North Sea. Duration of trips: 4 to 6 days.

*North Sea 5 – (Otter trawlers)*

Target species: Flatfish. Peak season: All year round. Area: Central and southern North Sea. Duration of trips: 5 to 8 days.

2) North Atlantic and NAFO

Fishing ground: NAFO areas

*North Atlantic 1 (Factory trawlers)*

Target species: Greenland halibut and cod. Peak season: 3<sup>rd</sup>/4<sup>th</sup> quarter. Area: West Greenland (NAFO Div. 1D). Duration of trips: 6 weeks to 3 months.

Fishing grounds: Western waters (ICES Sub-areas VI-VIII, mainly West of Scotland and West of Ireland)

*North Atlantic 2 (Pelagic freezer trawlers)*

Target species: Mackerel, horse mackerel, blue whiting, herring. Peak season: March to June/October/November. Area: West British waters and Bay of Biscay. Duration of trips: 3 to 4 weeks.

Fishing ground: Iceland, Greenland and Irminger Sea (ICES Sub-areas XII and XIV and Division Va)

*North Atlantic 3 (Factory trawlers)*

Target species: Greenland halibut and cod. Peak season: 2<sup>nd</sup>/3<sup>rd</sup> quarter. Area: East Greenland (ICES Div. XIVb). Duration of trips: 4 weeks to 3 months.

*North Atlantic 4 (Factory trawlers)*

Target species: Redfish. Peak season: 2<sup>nd</sup>/3<sup>rd</sup> quarter. Area: Irminger/Labrador Sea (ICES Sub-areas XII and XIV, NAFO Sub-areas 1-2). Duration of trips: 4 weeks to 3 months.

**b) Baltic Sea:**

The German fisheries in the Baltic Sea are separated into three fleet segments: 1) Demersal fish, 2) Sprat, 3) Herring.

The demersal fleet is further subdivided into 1a) passive SD2224, 1b) active SD2224, 1c) active SD2532. Each

year, a list of vessels is produced using the landings data from the previous year (e.g. the lists for 2017 are compiled 2016 with data from 2015). The lists are sorted by total landings per vessel. The fleet segment lists of 1a, 1b and 1c include all vessels that contributed ~60%, ~90 and ~90% of the total landings, respectively. The list of vessels is then randomised by assigning a random number to each vessel on a list. The sequence of the random number determines the sequence of contacting the vessel. There is only one list for the entire year. If all vessels from a list have been contacted before the year ended, the same list is used again. Sampling is conducted all year-round and the effort is distributed according to fishing seasons. Each phone call with fishers is documented since 2010. This forms the basis for our recordings of success/non-response/rejection/refusal rates. In addition, we record if the sample is random or based on expert knowledge. Expert knowledge partly is used to ensure efficient sampling coverage of periods/strata with very low landings, e.g. demersal species in quarter 3. Flounder, plaice and other flatfishes and fish species are sampled as part of the demersal sampling programme mainly targeting cod. However, if a vessel is selected, any fishing trip is sampled, except for trips targeting freshwater species, herring or sprat (see below).

An at-sea observer catch sampling programme (including concurrent sampling of landings, discards and unwanted by-catches) is conducted for the demersal fleet segments. In addition, a self-sampling programme with fishers is used to collect biological and catch data; unsorted commercial catch samples of usually 200-400 kg from the last or last but one haul are purchased. Diagnostics show that sampled trips are representative of the overall national population of vessels. In addition, pilot opportunistic sampling of landed discards (BMS cod under the landing obligation) in two major ports took place in 2015.

The primary sampling unit is the vessel x trip, the secondary sampling unit is the haul, the tertiary sampling unit is the fish in the haul.

The sprat catches mainly originate from two pelagic trawlers. Since 2013, we have a self-sampling programme where each vessel provides one frozen catch sample (5 kg) from each trip. This covers the ICES subdivisions 25-29. In addition, the minor sprat catches in SD22 and SD24 are sampled opportunistically upon expert knowledge and notification from the few fishers that are temporarily targeting sprat.

The fleet targeting herring is subdivided into 3a) passive SD2224, 3b) active SD24. For 3a, five major ports around the Greifswald Bay - the major fishing ground - are sampled using 50 kg unsorted catch samples from a vessel per port. Samples from the ports are taken from a known group of fishers which is considered representative for the respective fleet given that similar mesh sizes are used. For 3b, a 50 kg unsorted catch sample is taken from an arbitrary (pair) trawler landing in the only German herring processing plant in Neu-Mukran, Rügen island. During the herring season (Nov-Apr), each week either 3a or 3b is sampled. The day of the week is selected according to wind and logistic considerations. In addition, to estimate the by-catches of cod (and other species) of the herring trawlers, the by-catch of 3b landed in Neu-Mukran is sampled once bi-weekly since 2014.

On average, one or two samples are achieved/processed each week of the year. In the peak fishing season (i.e. quarter 1), up to nine samples are collected within one week (e.g. three demersal self-samples, two demersal observer trips, one sprat self-sample, three herring self-samples).

The métier of a sample is assigned *ex-post*. Each sample is raised from the haul to trip level. Replicate samples from the same métier are averaged and raised to all trips of the métier within a stratum (e.g. all landings of quarter 1-SD22-GNS).