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Regulation (EU) 2017/1004 of the European Parliament and of the Council of 17 May 2017

on the establishment of a Union framework for the collection, management and use of data in
the fisheries sector and support for scientific advice regarding the common fisheries policy
and repealing Council Regulation (EC) No 199/2008 (recast).

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 August 2016

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

Commission Implementing Decision (EU) 2018/1283 of 24 August 2018

laying down rules on the format and timetables for the submission of annual data collection
reports in the fisheries and aquaculture sectors.

German Annual Report for data collection in the fisheries and aquaculture sectors 2019

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Germany, however, was participating in the MARE/2014/19 project “Strengthening regional cooperation in the area of fisheries data collection” (FishPi), where regional statistically sound sampling schemes were tested. We were also involved in the FishPi2 project, which develops practical recommendations for regional sampling plans.....	74
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SECTION 1: BIOLOGICAL DATA

Text Box 1C: Sampling intensity for biological variables

General comment: This box fulfils paragraph 2 point (a)(i)(ii)(iii) of Chapter III, Chapter IV of the multiannual Union programme and Article 2, Article 4 paragraph 1 and Article 8 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report.

General remarks regarding all regions:

Several reasons imply that the collection of biological parameters from commercial fisheries is best handled by sampling-at-sea. This is due to

- the necessity to sample on board of freezer trawlers and trawlers with processing units. This is the case in the fishery for pelagic species, as these are landed in frozen packages. The same is true for landings of demersal species from waters off Norway and Greenland which are landed as partly processed products.
- monitoring discarding. It would be highly ineffective not to sample the landings and other biological data at the same time.
- providing the possibility to sample at the same time landings, discards and other catch fractions (related to the Landing Obligation) and to take otoliths and samples for sex and maturity.
- discards of species listed in Table 1D of Commission Decision 2016/1251 as by-catch in fisheries directed towards other species that can only be recorded on board.
- 69%, 68% and 73% of the landings in 2017, 2018 and 2019, respectively, having occurred in foreign countries.

Due to the reasons mentioned above, Germany prefers to sample catches at sea in the North Sea and North Atlantic. This is still the case with the Landing Obligation in force in parts of the fleet. In the Baltic Sea, there is at-sea, self-sampling and harbour sampling.

The status of a scientific observer on board of a German fishing vessel still is a guest status. Article 12.2 of Reg. 2017/1004 stipulates that *“the masters of Union vessels shall accept on board scientific observers and cooperate with them”*, which did however not improve this situation. The possibility for biological sampling depends on the hospitality of vessel owners and companies. Based on the present situation, random sampling of the fleet is difficult and might be not optimal in future (even if a new legal basis for on board sampling is in place), since some reluctance regarding observers will still remain for several fisheries.

Data are gathered in connection with sampling of commercial sources (observer trips, harbour and self-sampling) and on scientific surveys. Data are sampled on a yearly basis. Table 1C provides an overview on the species by region/fishing ground/area/stock that were sampled during 2019. Note that for some species (e.g. redfish and Greenland halibut), otoliths were only taken but not read due to lacking consensus on age reading methodology and validity.

The indications of the planned minimum numbers of individuals to be measured for the different variables are based on experiences with the German sampling scheme and survey catches. Even with the possibilities to adjust the numbers within the updates for the programme, it is not always possible to predict accurately if these planned numbers are reachable and realistic. In the following, the most common reasons for over- and undersampling are listed:

Reasons for oversampling:

For most of the fish stocks and brown shrimp, the number of length and age measurements well exceeded the planned and requested minimum number of measurements. As most of the measurements are taken on observer trips, the reason for "oversampling" is often that all fish of a once randomly chosen subsample have to be measured in order to calculate the retained and discarded fraction of the whole catch. Another reason is that once an observer is onboard, the entire trip is being sampled (i.e. sampling does not stop after a few hauls or fishing days, but lasts until the end of that trip). The sometimes very high numbers for weight@length (=individual weights) are taken to obtain reliable weight-length relationships.

Reasons for undersampling:

In several cases, the planned sample sizes have not been achieved. In some cases, this is due to the general rule for observers to collect stock-based variables of 10-12 fish per length class and area. If only very few

length classes occur during a fishing trip, this rule can lead to undersampling in terms of the planned numbers.

For surveys, no minimum numbers are given in Table 1C. Here, the survey manual stipulates the target of the survey in terms of fishing method, spatial and temporal coverage. Surveys are mostly not aiming to catch high numbers of a certain species but to get a standardized overview on the abundance and distribution of fish species.

Further explanations by region:

Baltic Sea:

1. Evidence of data quality assurance

All data quality assurance measures for the commercial and the recreational fisheries sampling programme are given in Table 5A.

2. Deviations from the Work Plan

The work plan for the Baltic Sea defines six stratum ID codes. In 2019, deviations occurred in three of these sampled strata.

Over-achievement:

Baltic active 2224 (+120%): On 22 July 2019, the European Commission issued an immediate measure to protect the cod stock of the eastern Baltic Sea (COM Impl. Reg. 2019/1248). These immediate measures provided that directed cod fishing should no longer be carried out in the areas SD24-26. However, fishing was not entirely prohibited, but bycatches of cod in trawling (which is then nominally a flatfish fishery using the same gear trawl gear) had to be discarded. This contradicted the spirit of the EU landing obligation for species regulated by a quota (and thus caused unnecessary discards of market-sized cod) put down in the basic regulation of the Common Fisheries Policy (Reg. 1380/2013). We implemented extra sampling effort to monitor the consequences of this immediate measure in SD24 (e.g. on discards, mixing of western and eastern Baltic cod).

Baltic passive 2224 (+475%): This metier contributes significant amounts to the total landings, especially of Western Baltic cod (>30%) but also for flatfishes. Despite this importance, there is a lack in biological data from this metier, not only regarding length distributions, but also in the discards (e.g. discard assumed as zero by Denmark). Thus, our sampling fills an important gap in the stock assessment input data. Moreover, this fleet involves a great proportion of the German fishing vessels in the Baltic Sea with considerable variations in species composition, gear settings, temporal and spatial extent, which was not fully recognised when the Work Plan was designed. Finally, potential bycatch issues exist (marine mammals and sea birds) and more intensive sampling was initiated to fulfil national and international requirements.

Moreover, additional samples were taken from the passive demersal fleet in SD24 to monitor the effects of the immediate measure to protect the cod stock in the eastern Baltic Sea (see above).

Baltic sprat (+850%): In 2012, a self-sampling cooperation was initiated with the two main trawlers targeting sprat and has been successfully continued since 2013. Improved work organisation in the lab enabled efficient work-up of samples without causing additional costs.

Under-achievement:

Baltic herring active 2224 (only 27% achieved): The planned number of 30 PSUs sampled per year is a false entry (see 'Deviations from the work plan' in Text Box 4A). In addition, reduced national quota shortened the fishing season and hence the number of samples that could be collected.

Baltic active 2532 (only 20% achieved): In 2019, only 14.7% of the German Eastern Baltic cod TAC were fished and the immediate measure (see above) further reduced the number of fishing trips. Therefore, the total number of PSUs in the sampling year was substantially lower than previously expected. Moreover, lack of free bunks limited the number of vessels that could take a scientific observer and the rejection rate also had increased. The introduction of the landing obligation in 2015 and still relatively high discard rates of eastern Baltic cod may have been another issue causing difficulties to get observers on board of fishing vessels.

3. Actions to avoid deviations

Conservative planning leads to exceeding the sampling plan, which results in so-called 'oversampling'. However, oversampling may not be the right term, as for statistical purposes, the sampling intensities in terms of trips are usually not too high. Given the relatively low coverage, any additional, statistically sound sampling data are useful and desirable, especially if they come with no additional costs – as in our case.

Since our sampling is proportional to the fishing activities, the under-achievement in the stratum “Baltic active 2532” just reflects the reduced number of fishing trips in 2019.

North Sea and Eastern Arctic:

1. Evidence of data quality assurance

See Table 5A. The sampling design and protocols follow the outcomes of sampling expert groups and/or the national standards. Sampling procedures and analysis are described and documented (see e.g. http://www.dcf-germany.de/fileadmin/sites/default/downloads/Beprobungsanleitung_2011-12.pdf). Data quality is checked by national routines. Germany is participating in relevant age reading and maturity workshops in order to ensure international agreement. Presently, we do not evaluate bias and precision of our data. A routine tool is still not available for such estimates on a national level. Furthermore, bias and precision should be evaluated on a regional level within the Regional Coordination Groups in order to assess the sampling levels on a broader coverage. Germany is participating actively in the Regional Coordination Group for the North Sea and Eastern Arctic, now combined with the North Atlantic group.

2. Deviations from the Work Plan

Oversampling and undersampling of the planned minimum number of individuals of a certain species are explained in the general remarks at the beginning of this paragraph. Further explanations are given in the following text if the deviation is >10% undersampling.

Undersampling of herring in ICES areas 1 and 2 for maturity, age and sex: Due to the small length range of the caught herring, the aim of 10 individuals/0.5cm/ fishing season/area was reached with a smaller number.

Undersampling of dab in ICES areas 4 and 7d for maturity, age and sex: Samples were taken randomly within the sampled trips. Due to the low by-catch of dab on some sampled trips, the aimed number of measurements could not be reached.

3. Actions to avoid deviations

Achieved sampling intensities higher than the planned values are explained above. For statistical reasons, the achieved sampling intensities cannot be considered too high. The occurrence of oversampling rather reflects conservative planning.

North Atlantic and NAFO:

1. Evidence of data quality assurance

See Table 5A. The sampling design and protocols follow the outcomes of sampling expert groups and/or the national standards. Sampling procedures and analysis are described and documented (see e.g. http://www.dcf-germany.de/fileadmin/sites/default/downloads/Beprobungsanleitung_2011-12.pdf). Data quality is checked by national routines. Germany is participating in relevant age reading and maturity workshops in order to ensure international agreement. Presently, we do not evaluate bias and precision of our data. A routine tool is still not available for such estimates on a national level. Furthermore, bias and precision should be evaluated on a regional level within the Regional Coordination Groups in order to assess the sampling levels on a broader coverage. Germany is participating actively in the Regional Coordination Group for the North Atlantic now merged with the North Sea and Eastern Arctic RCG.

2. Deviations from the Work Plan

Oversampling and undersampling of the planned minimum number of individuals of a certain species are explained in the general remarks at the beginning of this paragraph. Further explanations are given in the following text if the deviation is >10% undersampling.

Missed sampling of herring in ICES Div. 6a/6aN/6aS, 7bc/7a/7j for maturity, age and sex: This herring is only bycatch in the pelagic fisheries targeting other species. Landings were only 9 tonnes in 2019 and occurred on one trip in one haul only.

Undersampling of horse mackerel in ICES Div. 6a/6aN/6aS, 7bc/7a/7j for maturity, age and sex: Due to the small length range of the caught herring, the aim of 10 individuals/0.5cm/ fishing season/area was reached with a smaller number.

3. Actions to avoid deviations

Achieved sampling intensities higher than the planned values are explained above. For statistical reasons, the achieved sampling intensities cannot be considered too high. The occurrence of oversampling rather reflects conservative planning.

Germany is always aiming to fulfil all its sampling obligations. However, in case of some fisheries with very low number of trips and very long durations (e.g. up to three months), it is not always possible to place observers.

Other regions:

1. Evidence of data quality assurance
A multilateral sampling agreement for the CECAF area exists since 2011. For the SPRFMO area, a similar agreement is in force since 2015. Table 7A provides details on these agreements, and the national portal website ([dcf-germany.de](https://www.dcf-germany.de)) contains copies of the agreements. Sampling procedures are described in separate documents accompanying the multilateral agreements (<https://www.dcf-germany.de/index.php?id=190>). Germany is participating actively in the Regional Coordination Group on Long Distance Fisheries.
2. Deviations from the Work Plan
not applicable
3. Actions to avoid deviations
not applicable

SECTION 1: BIOLOGICAL DATA

Text Box 1D - Recreational fisheries

General comment: This box fulfills paragraph 2 point (a) (iv) of Chapter III of the multiannual Union programme and Article 2, Article 3 and Article 4 paragraph 1 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is intended to provide information on the design, implementation and analysis of all components of sampling schemes/ surveys that are listed in Table 1D.

1. Description of the target population

(i) German multiannual multistage survey:

Offsite: Marine recreational fishing effort of German households (all fishing methods & species), PSU = German household.

Onsite: CPUE All (resident, nonresident and foreign anglers in Germany | all fishing methods & species), PSU = angler

(ii) Baltic salmon survey: PSU trolling boat

2. Type of survey

The German marine recreational fisheries data collection program follows a multiannual multistage survey design (for further information, see Strehlow et al., 2012) and has been established in 2004/2005. This multistage survey design involves the following components: (i) off-site survey (mail-diary / telephone-diary) for angling effort estimation, (ii) on-site survey (data from completed trips for a stratified random sample of access points and days) for catch-per-unit-effort (CPUE) estimation, (iii) recreational cod catch length distributions from length measurements, (iv) length-weight relationship and age-length keys from commercial and survey (BITS) catches for conversion of numbers into biomass and depending on end user needs in CATON and CANUM (ICES InterCatch). The marine recreational fisheries data are stratified into sea-based (boat angling (including belly boat and kayak angling), charter vessel angling and trolling) and land-based (shore angling and wading) fishing practices. CPUE data and recreational cod catch length measurements are collected on a monthly basis and grouped half yearly to reduce variance. Further stratification of the data is by coastal Federal States (Mecklenburg-Vorpommern, Schleswig-Holstein), ICES Subdivision (22, 24), harvest and release component in numbers.

For the marine recreational salmon fishery in the Baltic Sea, an independent survey is conducted using remote cameras in harbours to monitor salmon fishing effort & on-site access point intercepts for CPUE and catch data composition (see Pilot Study 1 for details).

3. Data Quality

The ICES WGRFS has evaluated the German national recreational catch sampling scheme and has confirmed that the overall quality of the data is good and can be used for assessment purposes (ICES, 2014). Furthermore, the multiannual multistage survey design has been published in a peer-reviewed scientific journal (Strehlow et al., 2012).

4. Data Analysis and processing

Data processing and imputation procedures are documented (Strehlow et al., 2012; ICES, 2018). The estimation procedure follows the survey design. In the case of cod data, no precision estimates are calculated, as for assessment purposes, this is not a requirement. For salmon, confidence intervals for catches are calculated and provided for assessment purposes (ICES, 2018).

In general, a detailed documentation from the pilot study is being prepared and will be available during 2020, which includes an updated full documentation of methods, imputation procedures and bootstrapping of catch estimates.

References:

ICES. 2014. Report of the Working Group on Recreational Fisheries Surveys (WGRFS), 2-6 June 2014, Sukarrieta, Spain. ICES CM 2014/ACOM:37. 66 pp.

ICES. 2018. Report of the Baltic Salmon and Trout Assessment Working Group (WGBAST), 20–28 March 2018, Turku, Finland. ICES CM 2018/ACOM:10. 369 pp.

Strehlow, H.V., Schultz, N., Zimmermann, C., Hammer, C., 2012. Cod catches taken by the German recreational fishery in the Western Baltic Sea, 2005-2010: implications for stock assessment and management. ICES J. Mar. Sci. 69: 1769–1780.

SECTION 1: BIOLOGICAL DATA

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

General comment: This box fulfils paragraph 4 of Chapter V of the multiannual Union programme and Article 2 and Article 4 paragraph (3) point (a) of the Decision (EU) 2016/1701.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.

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.

4. Achievement

All objectives of the 1-year-telephone-diary survey and salmon trolling survey were achieved. We utilised a CATI Bus nationwide telephone screener of 52,000 households followed by a 1-year-telephone-diary survey with quarterly follow-ups conducted in 2014-2015. The final analysis and weighting procedure was conducted in 2017-2019. The German survey follows a multiannual multistage survey design, involving two different surveys: (1) off-site nationwide CATI Bus telephone screener, followed by 1-year telephone diary survey for national estimates of numbers of anglers and trips (pilot study) | (2) on-site multiannual access point intercept survey utilizing a stratified random sample of access points and dates to estimate catch per unit effort values. The remote camera survey conducted to estimate salmon catches revealed significant German recreational salmon catches with high interannual variation. However, weighting and estimation procedures of the nationwide off-site telephone screener took an exceptional amount of time and bootstrapping methods to obtain generalized precision estimates were planned to be carried out in summer 2018 but continued until 2019. The expected outcome of the pilot study (a detailed report in German, including an English extended summary) is currently available as a draft version. The final report will be available in 2020.

5. Incorporation of results from pilot study into regular sampling

The pilot 1-year-telephone-diary study provided updated estimates of the total numbers of marine recreational fishers and effort according to fishing platforms which were used to extrapolate catches using the annual German onsite intercept survey. A follow-up national survey (as the 1-year-telephone-diary study) is planned every 3-5 years to update effort data, depending on the availability of funds. It is currently planned and likely to start in summer 2020. As catch per unit effort values have high interannual variation, the on-site multiannual access point intercept survey is continued on an annually basis to obtain time series data on CPUE and collect catch composition data. The pilot salmon trolling survey also revealed high interannual catch variation and will therefore be continued as annual survey within the remits of the German recreational catch sampling programme

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 multiannual Union programme and Article 2 of the Decision (EU) 2016/1701.

General comment: This box is applicable to the Annual Report.

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, Rhine) 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.

Were the planned number achieved?

Yes regarding salmon data survey and partly the collection of biological variables for eel

No regarding biological variables for eel in the EMUs Eider, Rhine and Elbe, mostly due to the limited availability of eels from commercial fisheries. In the EMU Ems, sampling was almost complete with only 5% (i.e. 22 individuals) missing. Additional efforts were directed towards sampling of fish from the Schleie

fjord, where an opportunity arose to extensively and selectively sample a cohort of younger fish, with marked stocking material. The additional information from these fish is rare and of paramount interest to fisheries management and data collection, and sampling was therefore prioritized in 2019 (e.g. as compared to the sampling in the Elbe river, where an extensive dataset, and therefore no end-user need for additional data, exists).

Data on eel catch quantities and eel recruitment is collected annually, but data from 2019 will be available only later in 2020. An annual update on these data is provided in the ICES data call on eel and available to end-users. Data on the abundance of standing stock is reported in the Eel Management Plan progress reports on a three-year basis.

Optional targets from the national proposal were dropped and replaced with two pilot studies (also see 2018 report):

i) The use of environmental DNA in freshwater as an alternative assessment method to estimate eel abundance: As of now, a method for the detection of eel eDNA was developed and successfully tested. In addition, laboratory experiments were prepared. These experiments were successfully conducted in early 2020 (and will be reported next year accordingly) in order to assess the sensitivity of eDNA detection and minimum eDNA concentrations required for positive test results. These results and the development of a suitable method for eDNA detection will provide the basis for the field work starting in autumn 2020 and aiming the quantification of downstream migrating silver eels in the river Ems.

ii) impact of pollution on the spawner quality of eels in German EMUs and assessment of its relevance for the national management of the species (e.g. reproductive potential, net benefit of stocking): Sampling of silver eels as representative life stages for the spawning capacity of a local eel population has started and was partly completed in German EMUs. Also, method development for the detection of selected compounds, toxic to reproduction, was initiated. Additional specimens from relevant EMUs are planned to be sampled during the migration season in autumn 2020.

Salmon

For an executive summary on the challenges and state of salmon data collection in Germany, see 2018 report.

Currently, ICES WGNAS, as an end-user, does not use or require data from German extirpated salmon stocks. Assessment and collection of available data, however, is still necessary in order to establish a comprehensive overview of national salmon stocks and monitor reintroduction efforts. Due to the federal structure in Germany and resulting differences in local inland fisheries competences and responsibilities, achieving this remains difficult. Nevertheless, Germany has strengthened the position of DCF in the German salmon network and plans on functioning as a hub for EU and end-user-driven data requests on salmon stocks in the future. Further, results from the ICES data call on tagged salmon was compiled in 2019 and presented during the (remote) annual WGNAS meeting in 2020 and included the WGNAS 2019 report.

SECTION 1: BIOLOGICAL DATA

Text box 1F: Incidental by-catch of birds, mammals, reptiles and fish

General Comment: This box fulfils paragraph 3 point (a) of Chapter III of the multiannual Union programme and Article 2 of the Decision (EU) 2016/1701. This box is applicable to the Annual Report. This box is applicable only for those sections where Member States have reported that they have been carrying out regular sampling. Results and deviations for Pilot studies should be reported under Pilot Study 2.

1. Results

In certain German fisheries, the by-catch of single specimens of vulnerable species was observed very occasionally (see Table 1F). In 2019, no by-catch of mammals and birds was observed in the North Sea and North Atlantic area. Occurring by-catch of listed fish species (e.g. *Rajidae*) was notified. It was attempted to release the specimens alive when possible.

2. Deviations from Work Plan

No deviations. Our sampling covers all bird and marine mammal species (no reptiles occur in our fishing areas). Species are identified to the lowest possible taxon (species level). Birds are usually dead and collected for sampling; the carcasses are provided to the Institute for Terrestrial and Aquatic Wildlife Research of the University of Veterinary Medicine Hannover (ITAW Büsum) in Germany. Cormorants are not collected.

3. Data quality

- Does the onboard observer protocol contain a check for rare specimens in the catch at opening of the codend? If YES is the observer instructed to indicate if the codend was NOT checked in a haul?

Yes for the North Sea and North Atlantic. The observer is advised to give an indication to which amount he was able to check the fishing activities for accidental by-catch.

Baltic Sea: No. Onboard vessels using passive gear, the entire catch is sampled (concurrent sampling) and all species in the catch are recorded. On vessels using active gear, the observer is usually on deck when the codend comes onboard and sampling is concurrent.

- In gill nets - and hook-and-line fisheries: does the onboard observer protocol instruct the observer to indicate how much of the hauling process has been observed for (large) incidental bycatches which never came on board (because they fall out of the net)? In large catches: does the protocol instruct to check for rare specimens during sorting of the catch (i.e. at conveyor belt)? Is the observer instructed to indicate what percentage of the sorting or hauling process has been checked at "haul level"?

North Sea and North Atlantic: Gill nets are only used by very few vessels in the North Sea and north-western waters. Due to the negligible effort, these vessels are not included in the observer program.

Baltic Sea: No, but usually the observer is on deck and observes the hauling process unless the observer is processing the sample. In large catches, subsamples are taken and all species in the subsample are identified to species level. Observers are instructed to indicate the percentage of the haul they have sampled.

- Does the onboard observer protocol instruct to report on the use of mitigation (i.e. Escape Devices or Acoustic Deterrent Devices)?

Yes, but only in use in the German Baltic Sea fisheries.

- Does the sampling design and protocol follow the recommendations from relevant expert groups? Provide appropriate references. If there are no relevant expert groups, the design and protocol have to be explained in the text.

The question is unclear. We follow the current sampling guidelines of the DCF/EU-MAP and try to include suggested improvements of relevant working groups (e.g. WGCATCH, WGBYC) whenever it is useful to our working routine. Our current sampling programme is not directed at sampling incidental bycatches or collecting additional data on sea birds or marine mammals (e.g. counting bird swarms or estimating the size of whale schools during the sampling).

- Are data quality issues taken into account?

The question is unclear. Sampling coverage follows the sampling obligations in accordance with the Commission Implementing Decision (EU) 2016/1251. Observers are trained for species determinations.

- How are data (and samples) stored

The data are stored in a national database. Samples of incidental bycatch are only stored temporarily in a freezer and then provided to specialised research groups in Germany (e.g. ITAW Büsum).

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 multiannual Union programme and Article 2 and Article 4 paragraph (3) point (b) of the Decision (EU) 2016/1701.

General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study.

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

2. Duration of pilot study

36 months (1 Jan 2017 – 31 Dec 2019)

3. Methodology and expected outcomes of pilot study

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.

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 study, Germany will help to develop and parameterise management strategy evaluation tools that account for mixed-fisheries and multi-species interactions 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.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

1. Achievement of the original expected outcomes of pilot study and justification if this was not the case

A German Bight stomach sampling programme was introduced in 2018 for the first time. The German Bight is the main sampling area for Germany. A rolling scheme has been established with the plan to sample each year one of the most important fish predators in the German Bight (whiting, cod, mackerel, turbot, grey gurnard). The rolling scheme started in 2018 with whiting and was continued with cod (*Gadus morhua*) and turbot (*Scophthalmus maximus*) in 2019. Stomachs were sampled during various national and international surveys in the German Bight (IBTS, German Box survey (GSBTS), German EEZ survey (GAS EEZ), German young fish survey (DYFS) and a survey dedicated to sample brown shrimp and its predators four times a year). Because the surveys cover different spatial scales (e.g., Box survey as small-scale survey vs. IBTS as large-scale survey), the uncertainties in diet data and spatial autocorrelation can be analysed in a better and more detailed way than in any other sampling design based on only one survey. The surveys also cover near-shore and offshore areas to obtain a complete picture of feeding relationships in the German Bight. The sampling strategy is based on the guidelines from WGSAM (ICES 2010), i.e. the target is to sample three stomachs per 5 cm predator length class per station. As many stations as possible will be sampled. The analysis of the stomach contents follows the protocol from the last international stomach sampling study (MARE/2012/02-SI2.632887). In 2018, approximately 1500 whiting were sampled in the German Bight. The frozen samples were processed at the Thünen Institute of Sea Fisheries in Bremerhaven, Germany. A total of 820 fish were weighed, length measured, sex distinguished and the stomach content mass was weighed and the contents stored in ethanol. The analysis of the stomach contents is ongoing. So far, 415 stomachs have completely been analysed. The evaluation of the data will be conducted, when all whiting stomachs have been analysed. In 2019, approximately 150 cod and turbot stomachs were sampled and will be analysed once the whiting work has been finished.

In the Baltic Sea, cod stomachs are sampled on a regular basis since 2015. In addition, stomach contents of cod from the Belt Sea (SD22) were analysed for a PhD project. In addition, several thousand cod stomachs were already sampled and analysed from the Arkona Basin (SD24; sampling years 2017, 2018) and the Bornholm Basin (SD25; sampling years: 2018, 2019). The analyses are in the final stage. Moreover, stomach contents of the major flatfish species from the Bornholm Basin (i.e. flounder, plaice) are sampled (sampling years: 2018, 2019) and analysed as part of B.Sc. and M.Sc. theses.

During 2019, the mixed fisheries model FLBEIA was further developed to be operational in ICES WGMIXFISH for the purpose of providing short-term advice on choke situations. Multiple instances of the model can now be run in parallel on a cluster, allowing for more computer-intensive simulations within a full Management Strategy Evaluation (MSE) framework, where multiple runs are a requirement for addressing aspects of uncertainty (e.g. risk of an undesired outcome). The model now includes 25 stocks (cod, haddock, saithe, sole, plaice (2 stocks), whiting, nephrops (10 functional units, dynamics not modelled), turbot, brill, witch flounder, dab, anglerfishes (both species together), lemon sole and ling). The inclusion of additional stocks was used to address whether strict quota (i.e. total allowable catch, TAC) and discard ban compliance is able to protect non-TAC, bycatch stocks. The findings showed that TAC compliance does sufficiently protect these bycatch stocks, which is in part driven by the strong choking effect of North Sea cod. Further developments includes the incorporation of: 1)

Environmentally-mediated stock-recruitment relationships (SRRs) and 2) Dynamic predation mortality rates based on changing densities between prey and predators. Both aspects will allow for improved realism in the evaluation of management strategies in medium- to long-term scenarios that consider climate change and changes in stock equilibria. Economic parameterization is continuing to be improved through cooperation with members of ICES WGECON, which will aid in the evaluation and optimization of socioeconomic considerations. These include scenarios focussed on yield and economic maximization, which may be achieved through improved effort allocation among fleet/meters.

2. Incorporation of results from pilot study into regular sampling by the MS

The experience from the German stomach data sampling trial will be discussed at regional meetings (RCGs), survey planning groups and WGSAM. If other countries agree, the rolling scheme can be easily harmonized with other countries. The aim is to cover finally the whole North Sea. However, this depends on the willingness of other countries. In any case, Germany will deliver an overview on its sampling scheme, associated costs and uncertainties inherent in final data products. This will give guidance on which basis Germany will establish a regular sampling scheme.

In the Baltic Sea, the sampling of cod stomachs has been implemented as part of the sampling routine in commercial samples and in surveys-at-sea since 2015.

The sampling of sensitive bycatch is already incorporated in the regular sampling programme (*cf.* Table 1F and Text Box 1F).

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

24 months (1 Jan 2018 – 31 Dec 2019)

3. Methodology and expected outcomes of pilot study

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 métier 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 study, Germany will help to develop and parameterise management strategy evaluation tools that account for 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.

Brief description of the results obtained (including deviations from planned and justifications as to why if this was not the case).

1. Achievement of the original expected outcomes of pilot study and justification if this was not the case

In the first phase of this pilot study, international fishing effort data were analysed in the German Bight in order to quantify fishing pressure on the seafloor. For this, we followed a similar indicator and

assessment framework as described in ICES (2017) and used the swept area ratio (SAR) as proxy for seafloor abrasion. However, some adaptations were necessary in order to obtain estimates that are temporally and spatially more precise for the southern North Sea.

Fishing effort was calculated by combining information from Vessel Monitoring System (VMS) and national logbook data as well as from the European Fleet Register. Fishing segments were distinguished on métier level 4, i.e. gear type, but with further separation of small and large beam trawlers (by engine power $>221\text{kW}$). By this definition, the regionally very important near-coastal shrimp fishery with small beam trawls could be distinguished from the more-offshore flatfish fishery, mainly targeting sole and plaice, with larger and heavier beam trawls. The average beam width was specified by using information from fisheries observer protocols, whereas for all other bottom-contacting gears, gear footprint size was estimated according to Eigaard et al. (2016). Various approaches for calculating fishing effort were tested. For swept area estimates, best results could be achieved by interpolating VMS points with the cubic Hermit spline method (Hintzen et al., 2010): The distance between (interpolated) points identified as fishing were multiplied with the corresponding gear width to calculate swept area values. Swept area was visualised on different temporal and spatial scales. For DCF, annual swept area estimates are currently available from 2012-2018 with upcoming estimates for 2019. Nevertheless, information is now readily available for assessing different, also shorter than annual time scales. We e.g. initiated a study comparing area estimates from trawling tracks identified from side-scan sonar images with VMS-based estimates in order to quantify the persistence of trawl marks. The higher spatial and temporal resolution of information in comparison to SAR estimates from ICES (e.g. ICES, 2018), further enables us to assess fishing pressure in relation to habitats, water depth, as well as natural disturbance, such as shear stress. The latter formed the basis for an indicator called disturbance ratio, which relates the annual swept area ratio with the annual bedload transport frequency and by this quantifies if natural or fisheries disturbance prevails. DCF indicators 5, 6, and 7 (i.e. distribution of fishing activities, aggregation of fishing activities, and areas not impacted by mobile bottom contacting gears) were calculated based on SAR calculations for the German Bight as well as for the corresponding MSFD marine reporting units. To avoid overestimation of areas affected by fisheries, the method developed by ICES (2017) was adopted assuming a random distribution of trawling tracks in each spatial unit. As an example, based on data from 2012-2016, on average 45% of the German offshore areas and 62% of the coastal areas were fished with bottom-contacting gears with relatively little interannual variation. The completed small-scale SAR estimates can be now related to by-catch information on rare and sensitive species, helping to assess ecosystem effects of fisheries.

In 2018 and 2019, Germany significantly contributed to ICES WGSFD (Working Group on Spatial Fisheries Data), WKTRADE (Workshop to evaluate trade-offs between the impact on seafloor habitats and provisions of catch/value) and WGFBIT (Working Group on Fisheries Benthic Impact and Trade-offs), the latter developing models to determine the impact/status of the seabed. These models form the basis for the future advice in relation to fisheries impact on habitat quality, and the Pilot Study plans to adapt them for a regional North Sea assessment.

2. Incorporation of results from pilot study into regular sampling by the MS

VMS and logbook data are collected on a routine basis and are provided for scientific and management purposes usually four times a year. Workflows are now fully developed to provide annual fishing pressure assessments, and by this to answer regular ICES data calls according to fisheries abrasion. Germany provides information on analytical improvements to the respective groups (especially to WGSFD).

References:

- Eigaard, O. R., et al. 2016. Estimating seabed pressure from demersal trawls, seines, and dredges based on gear design and dimensions. ICES Journal of Marine Science 73(Suppl 1): i27-i43.
- Hintzen, N. T., et al. 2010. Improved estimation of trawling tracks using cubic Hermite spline interpolation of position registration data. Fisheries Research 101(1–2): 108-115.
- ICES. 2017. Interim Report of the Working Group on Spatial Fisheries Data (WGSFD), 29 May – 2 June 2017, Hamburg, Germany. ICES CM 2017/SSGEPI: 16. 42 pp.
- ICES. 2018. Report of the Working Group on Spatial Fisheries Data (WGSFD), 11-15 June 2018, Aberdeen, Scotland, UK. ICES CM 2018/HAPISG: 16. 79 pp., thus enabling other countries to adopt them in their respective workflow.

SECTION 1: BIOLOGICAL DATA

Text Box 1G: List of research surveys at sea

General comment: This box fulfills Chapter IV of the multiannual Union programme and Article 2 and Article 7 paragraph (3) of the Decision (EU) 2016/1701. It is intended to specify which research surveys at sea set out in Table 10 of the multiannual Union programme will be carried out. Member States shall specify whether the research survey is included in Table 10 of the multiannual Union programme or whether it is an additional survey.

General comment: This box is applicable to the Annual Report. This box should provide complementary information on the performance of the surveys, the results and their main use.

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 stored 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)

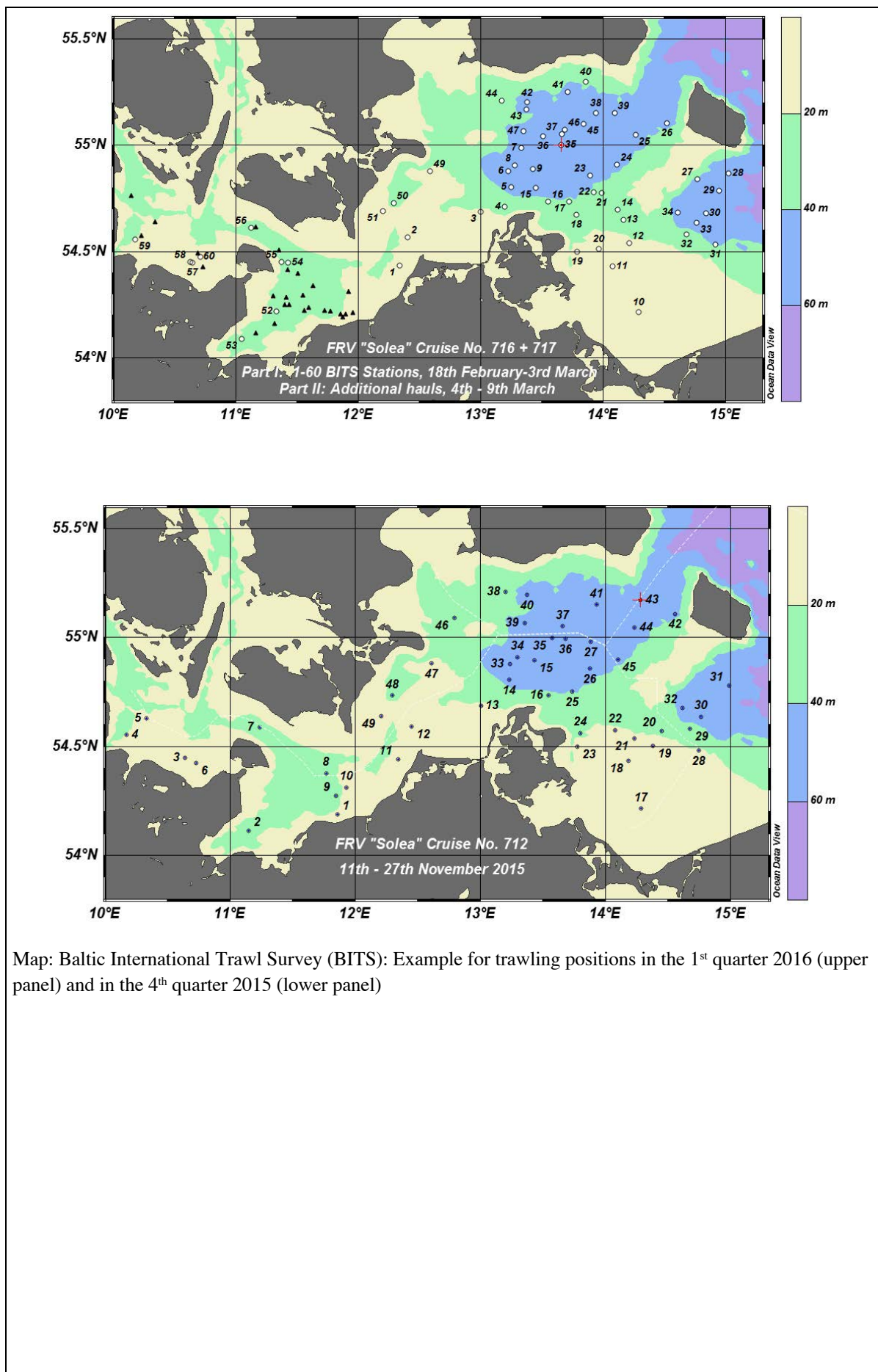
See survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

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 (F/V LB1010), 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.

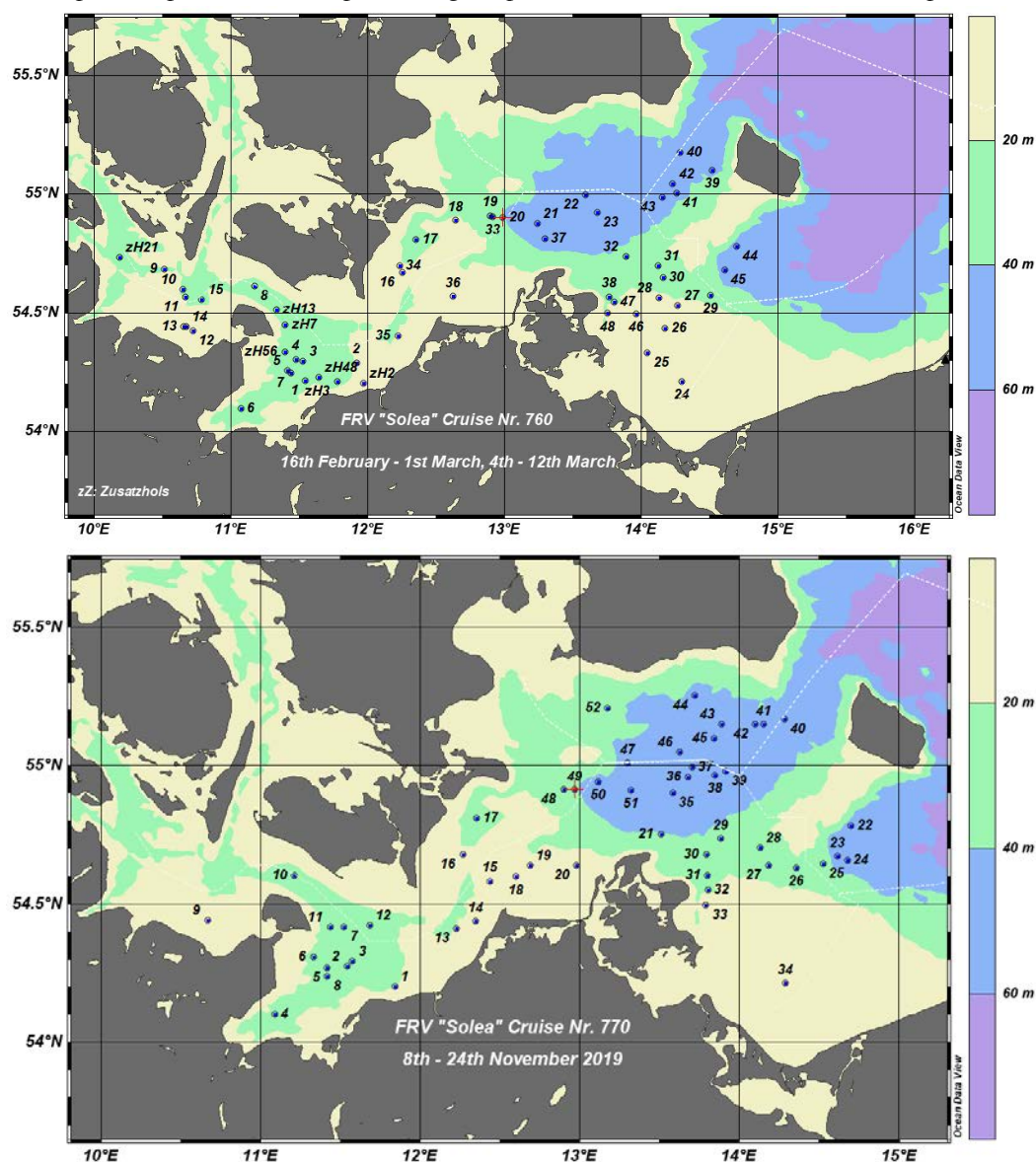
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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 1st quarter 2016 (upper panel) and in the 4th quarter 2015 (lower panel)

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Baltic International Trawl Survey (BITS): Distribution of the trawling positions in quarter 1 (upper panel) and 4 (lower panel) in 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<http://www.ices.dk/sites/pub/Publication%20Reports/Forms/DispForm.aspx?ID=32979>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Target species are demersal fish species, mainly Baltic cod and flatfish species (mainly flounder, plaice, dab, turbot and brill). 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-feeding 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.

8. Extended comments (Tables 1G and 1H)

none

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 and pilchard. 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 the ICES Acoustic Trawl Database has been implemented.

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

see survey manual:

[https://www.ices.dk/sites/pub/Publication Reports/ICES Survey Protocols \(SISP\)/2017/SISP 8 IBAS 2017.pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/2017/SISP%208%20IBAS%202017.pdf)

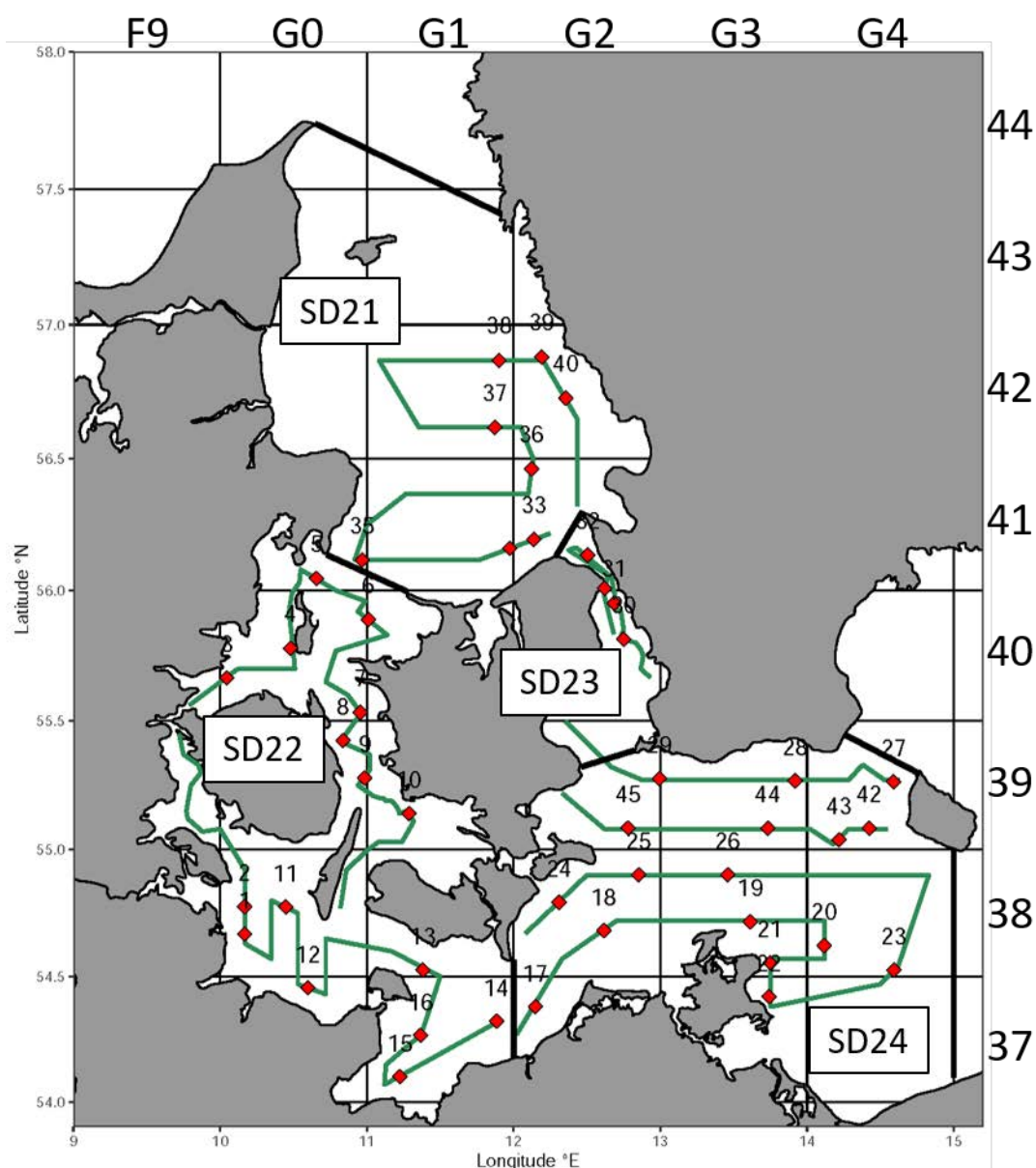
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

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/WGIPS are 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.

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Baltic International Acoustic Survey (BIAS), October 2019: Cruise track/hydroacoustic transects (green lines) and realized trawl hauls (red diamonds).

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

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

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

Latest report submitted and currently being prepared for publication.

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey results are used for the assessment of WBSSH by the ICES Herring Assessment Working Group (HAWG) as fishery independent abundance indices.

8. Extended comments (Tables 1G and 1H)

none

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 an Access-database and the ICES international database.

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

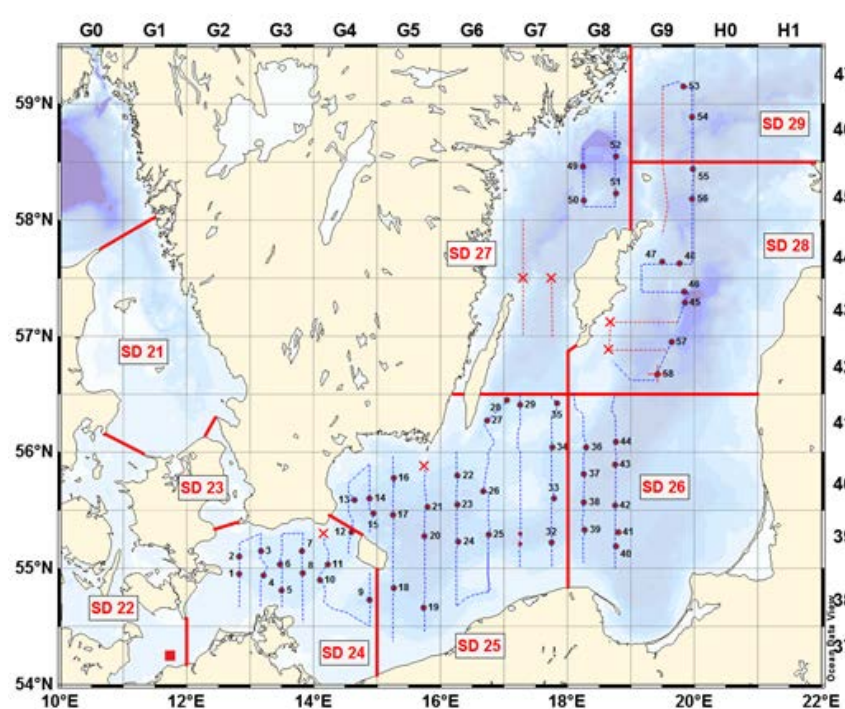
see survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

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.

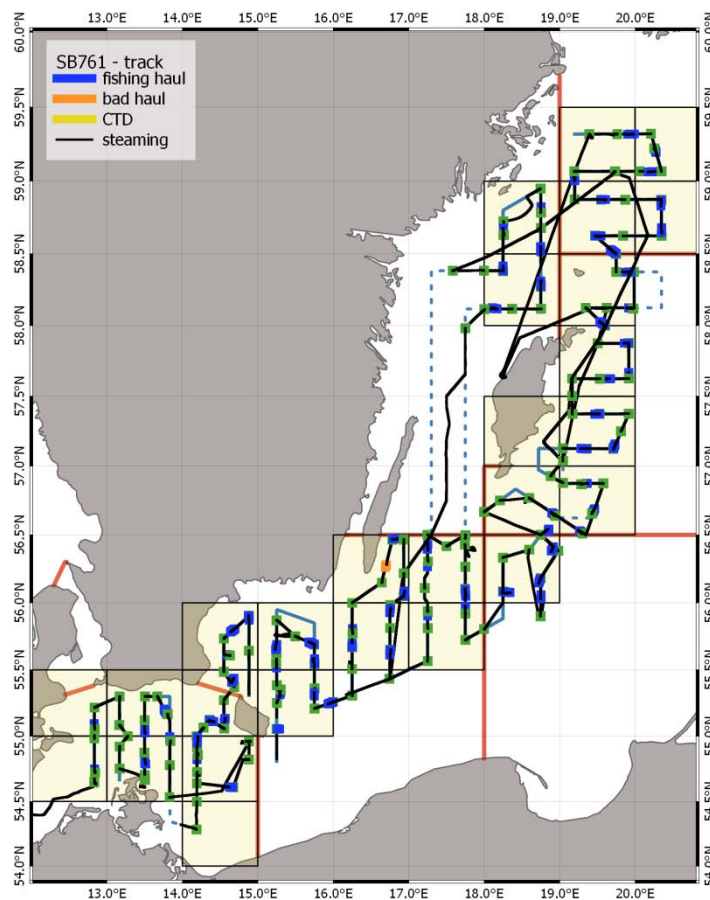
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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), May 2015: Example of a cruise track

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Sprat Acoustic Survey (SPRAS), May 2019: Cruise track and activities

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

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

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The data are used as an index for the stock assessment of Baltic sprat.

8. Extended comments (Tables 1G and 1H)

Time at sea was also used to collect wideband hydroacoustic data with the EK80 echosounder installed on the FRV "Solea". This echosounder is able to work in a wide range of frequency, which could enable remote identification of different fish species/groups. Such approach would greatly improve the precision of the future SPRAS as well as other similar surveys in the Baltic Sea, but requires more in-situ data in similar settings to the SPRAS. To this effect, the echosounder was turned in wideband mode while fishing whenever possible. Additionally, due to bad weather one full day of survey was lost while the ship took shelter.

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 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)

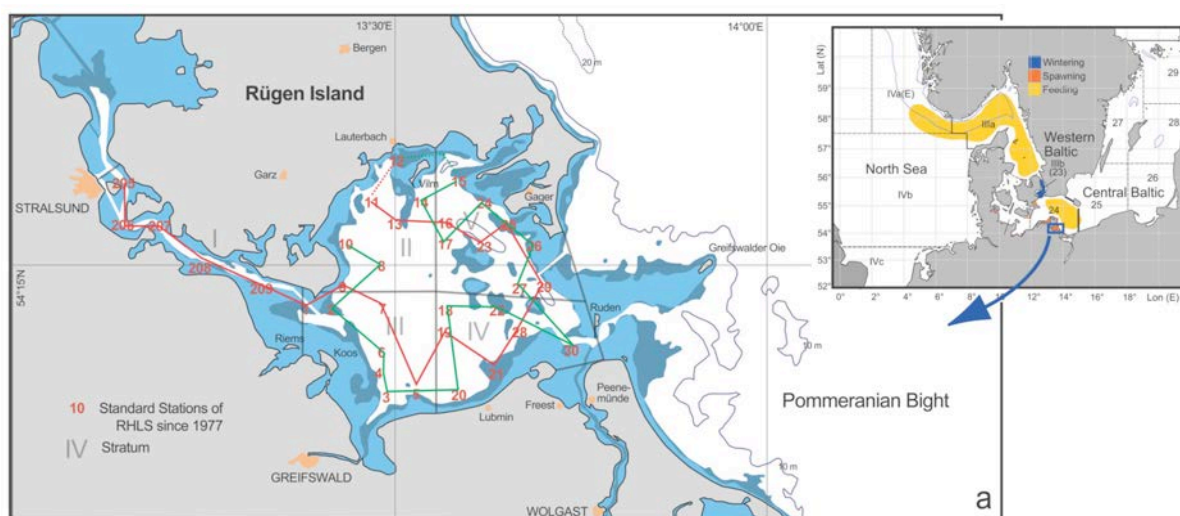
Manual is available on request.

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.

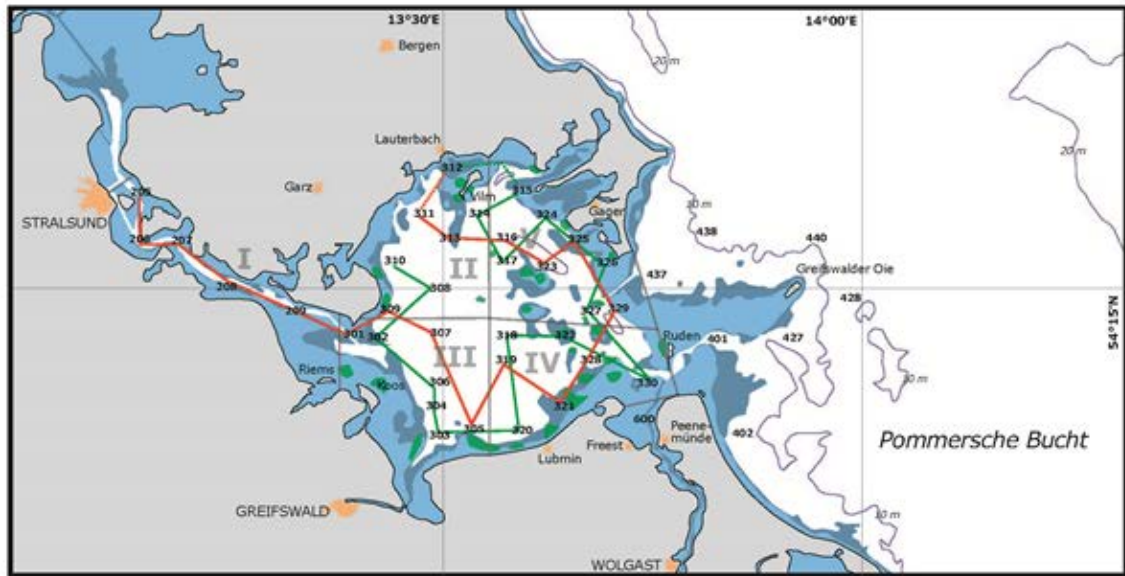
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only.



Map: Rügen Herring Larvae Survey (RHLS), Cruise track and station plan

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Rügen Herring Larvae Survey (RHLS), March-June 2019: Cruise track and station plan

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.
<https://www.ices.dk/community/groups/Pages/WGSINS.aspx>
7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey results (N20 index) are used for the assessment of Western Baltic Spring-Spawning Herring by the ICES Herring Assessment Working Group (HAWG) as fishery independent abundance indices.

8. Extended comments (Tables 1G and 1H)

none

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

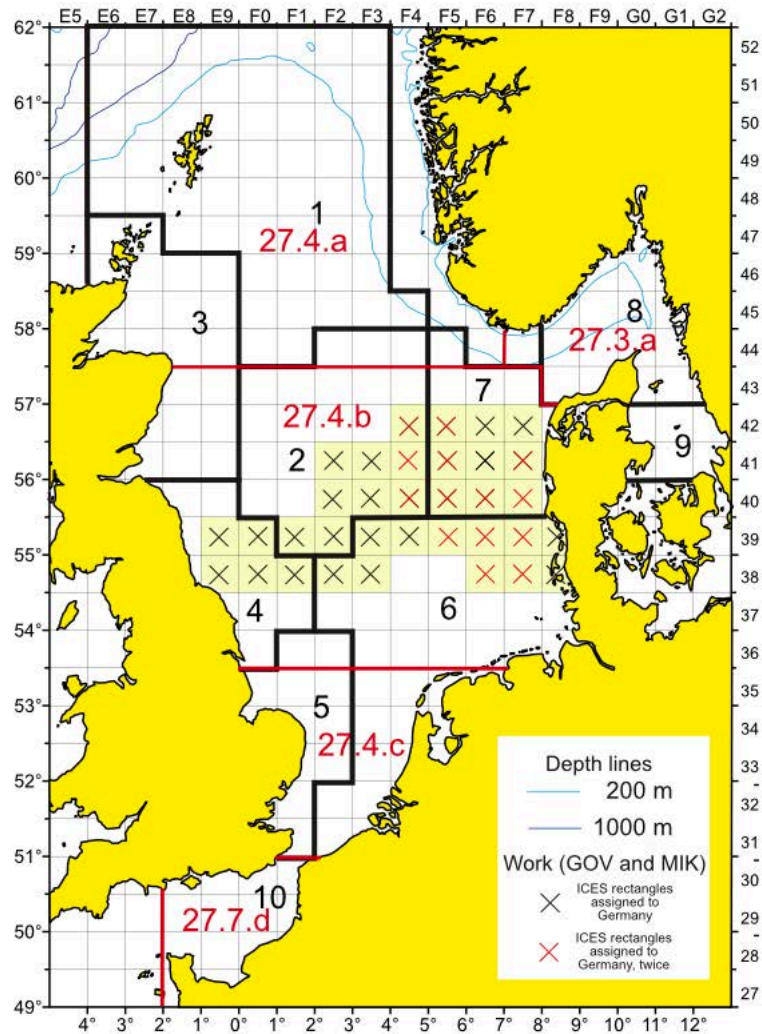
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

France: RV Thalassa, The Netherlands: RV Tridens, Germany: RV Dana (charter in replacement of 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).

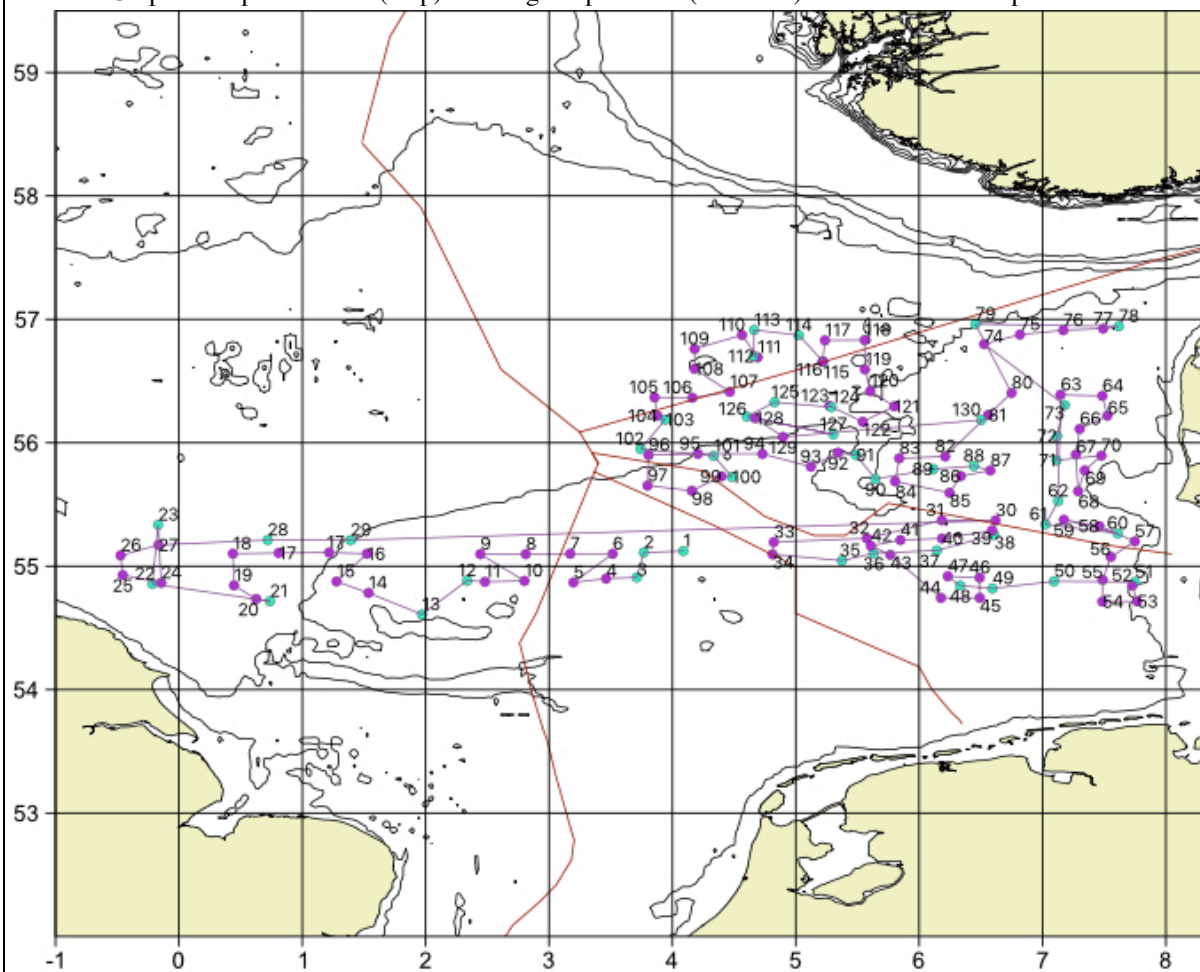
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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: Planning map for German Coverage in 2019 (Q1). Because of engine problems with the German FRV Walther Herwig III, which necessitated major repair works, the vessel had to be replaced by chartering the Danish RV Dana. The Danish vessel was only available for 20 days in January 2019 and the original survey plan had to be adapted by swapping major parts of the survey area with Denmark, reducing the amount of planned stations from 69 GOV/CTD and 142 MIK stations to 48 GOV/CTD and 96 MIK stations.

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: GOV-hauls, CTD- and MIK-Stations of RV Dana cruise 01/2019 in 2019. Green dots: combined CTD and GOV-trawl stations, purple dots: MIK stations. The purple line indicates the travelled routes between stations.

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<https://www.ices.dk/community/groups/Pages/IBTSWG.aspx>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey indices for commercial fish species are used in the assessment by ICES WGNSSK, HAWG and WGWISE.

8. Extended comments (Tables 1G and 1H)

none

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, whiting, Norway pout, herring, sprat, mackerel and plaice in the North Sea and the Skagerrak. Germany participates as one of six nations in the internationally coordinated Q3 survey. Apart from abundance indices, information is collected on individual length, weight and age for the target species. Additional age data are obtained for selected fish species to be evaluated for future use in assessments. 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 abundance and distribution of fish species not commercially targeted, and in the composition of regional groundfish assemblages.

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. 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>

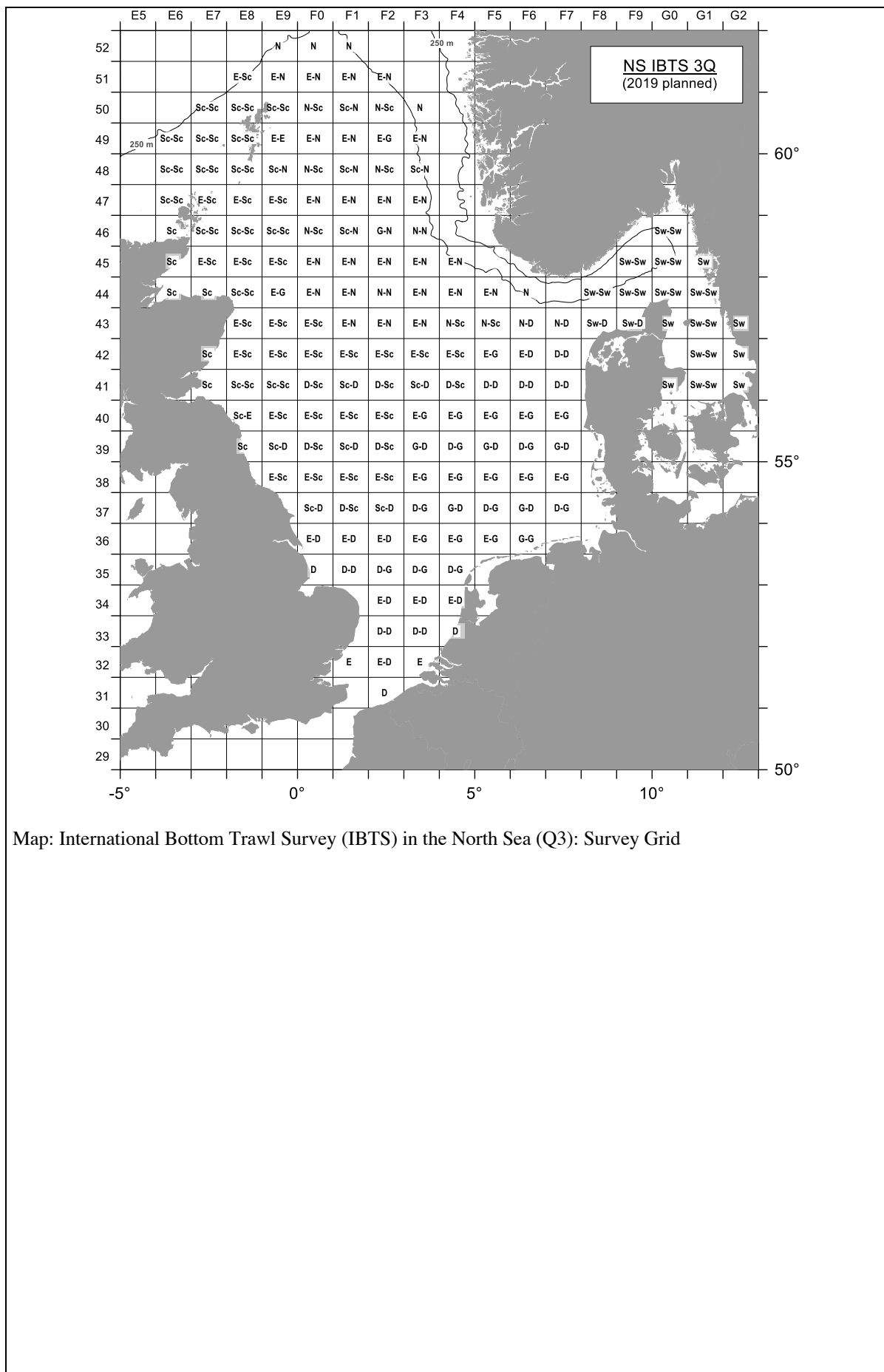
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

UK England: RV Endeavour, Germany: FRV Walther Herwig III, Denmark: RV Dana, Sweden: RV Dana, Norway: RV Kristine Bonnevie, UK Scotland: RV Scotia

Coordinating body is the ICES IBTSWG.

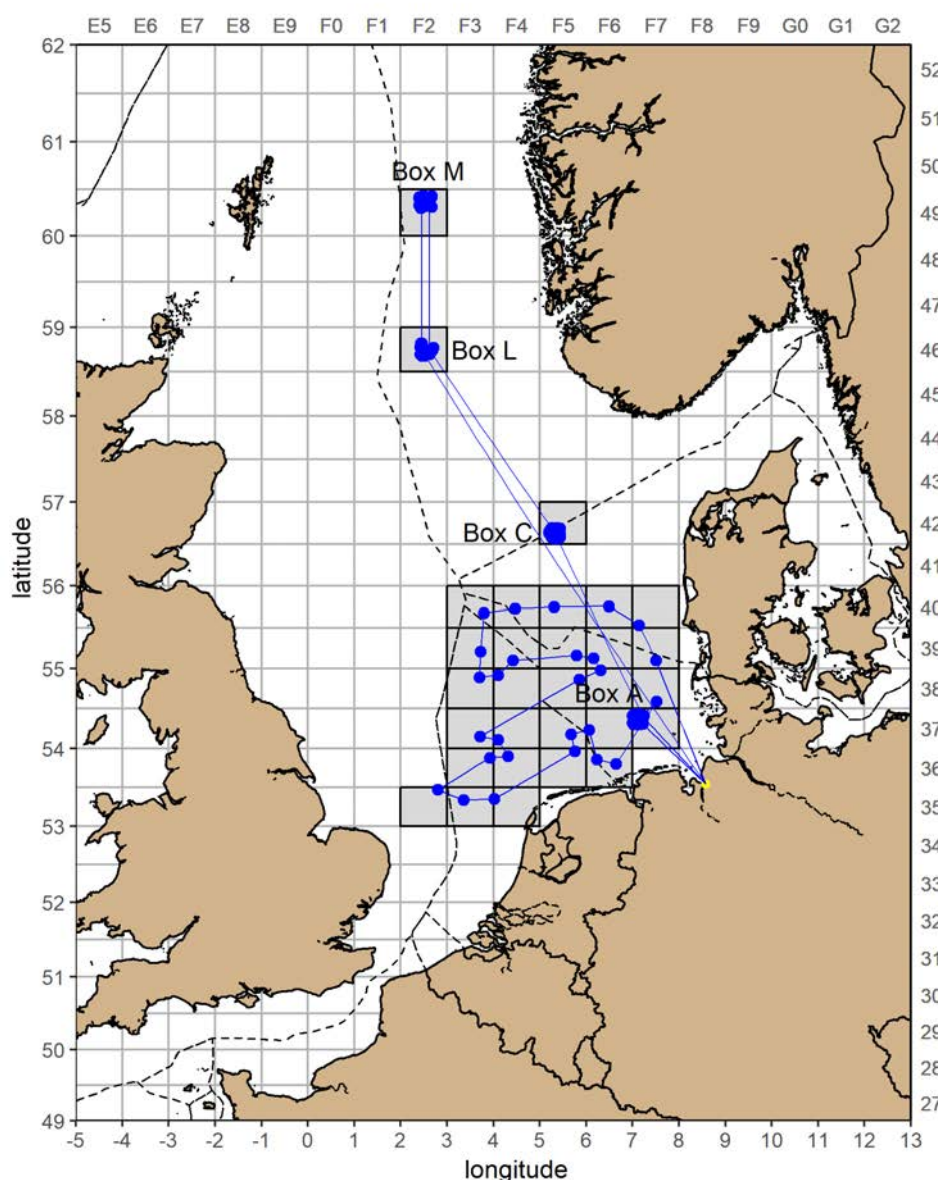
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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.



Map: International Bottom Trawl Survey (IBTS) in the North Sea (Q3): Survey Grid

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: International Bottom Trawl Survey (IBTS) in the North Sea (Q3); German contribution during cruise WH428: Position of the fishing stations in 2019 (note that in the research areas marked by “Box” and capital letters only one station each is dedicated to the IBTS, the other stations in the boxes belong to the GSBTS, see below.)

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

IBTS: <http://ices.dk/community/groups/Pages/IBTSWG.aspx>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey indices for commercial fish species are used in the assessment by ICES WGNSSK, HAWG and WGWISE

8. Extended comments (Tables 1G and 1H)

none

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://ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20\(SISP\)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20\(WGBEAM\).pdf](http://ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%2014%20-%20Manual%20for%20the%20Offshore%20Beam%20Trawl%20Surveys%20(WGBEAM).pdf)

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

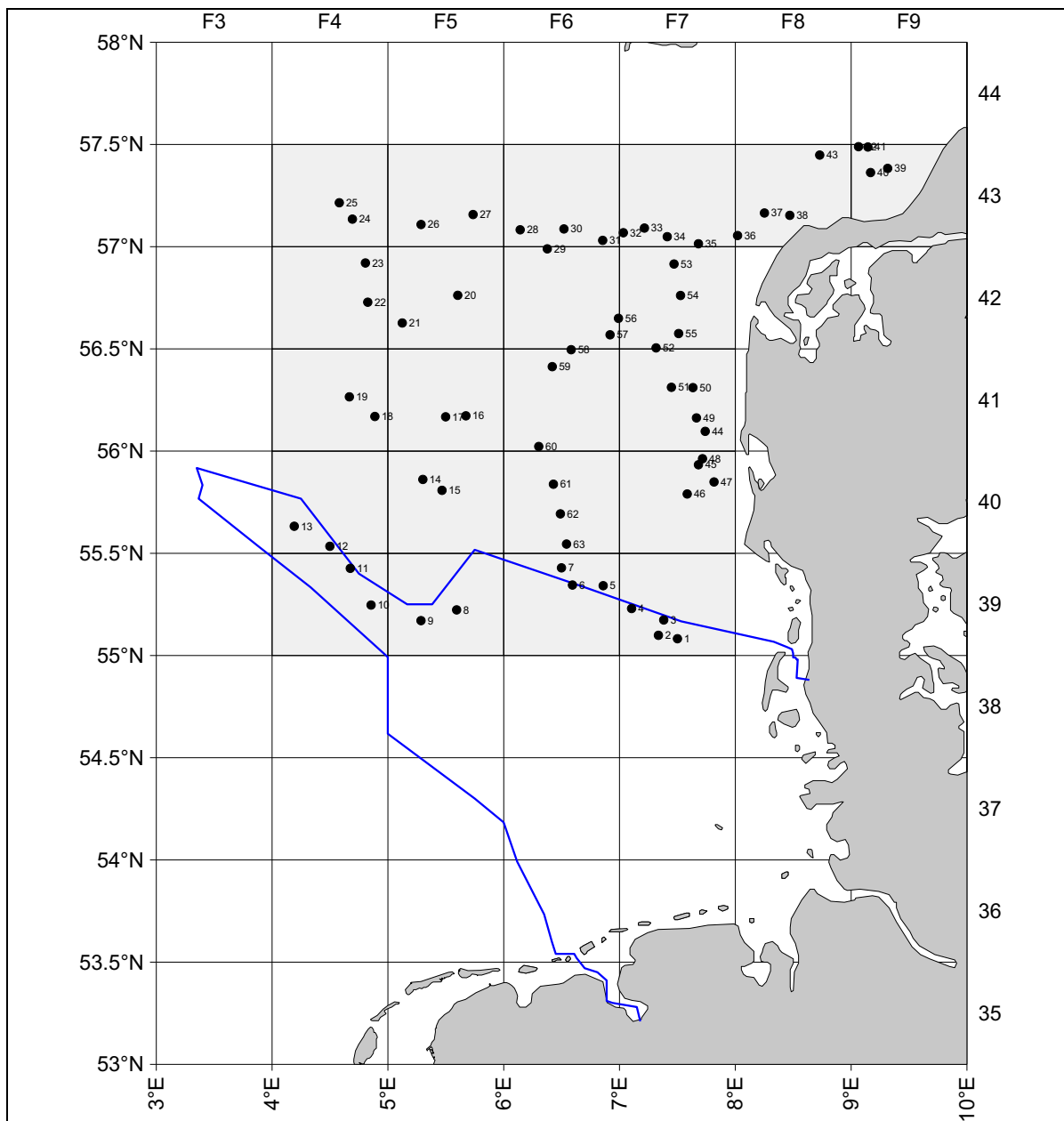
The Beam Trawl Survey in the North Sea and Eastern English Channel is carried out by Belgium, Germany, Netherlands and UK-Cefas.

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.

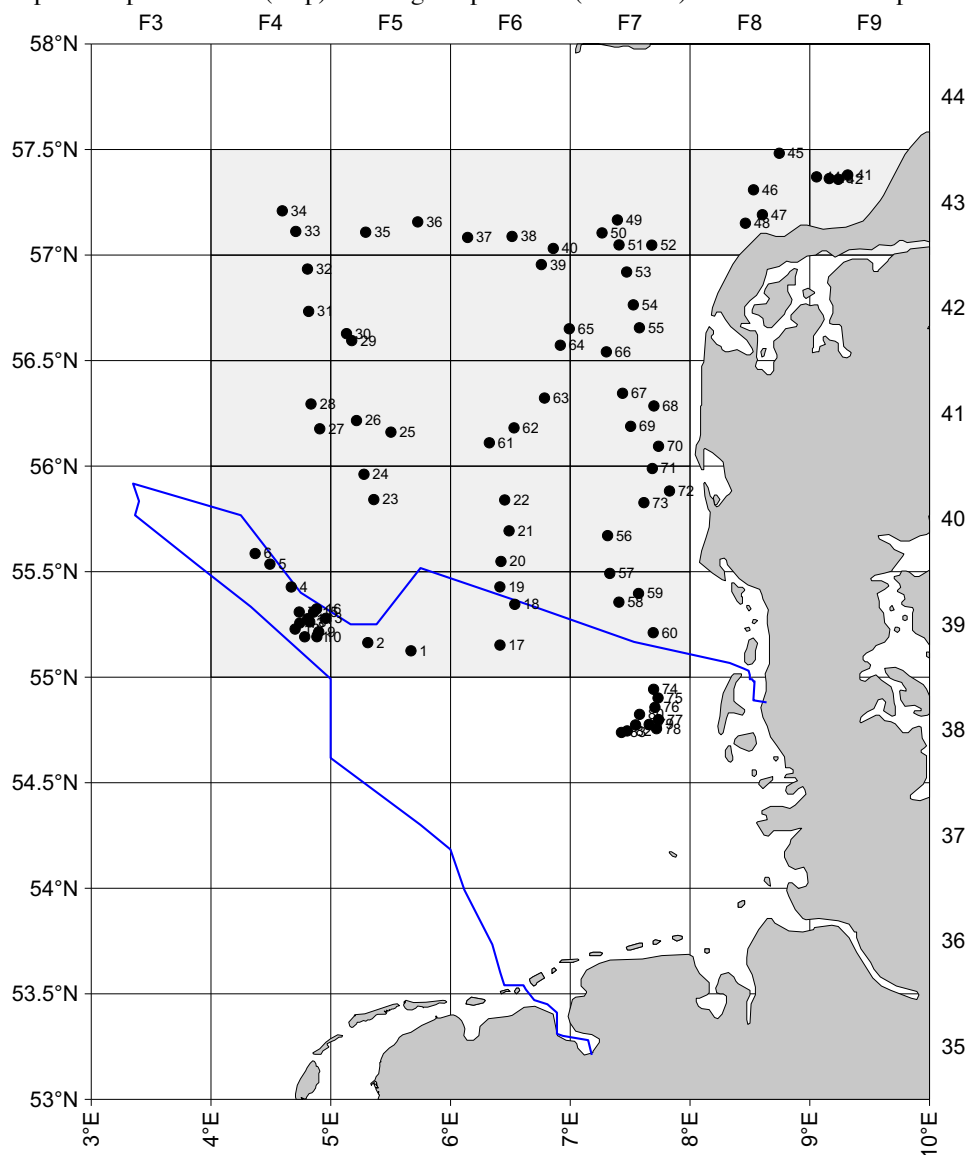
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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): Example for station plan

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: North Sea Beam Trawl Survey (BTS): Realized fishing stations 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

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

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

ICES WGNSSK: *Limanda limanda*, *Pleuronectes platessa*, *Solea solea*; indices by age group, age 1-10+

ICES WGEF: elasmobranch species; CPUE per species per haul

Density plots per species: <http://ecosystemdata.ices.dk/map/>

8. Extended comments (Tables 1G and 1H)

none

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 are submitted to the ICES DATRAS data base. Data are used by ICES WGNSSK, 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 sensor for time, temperature, salinity 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>

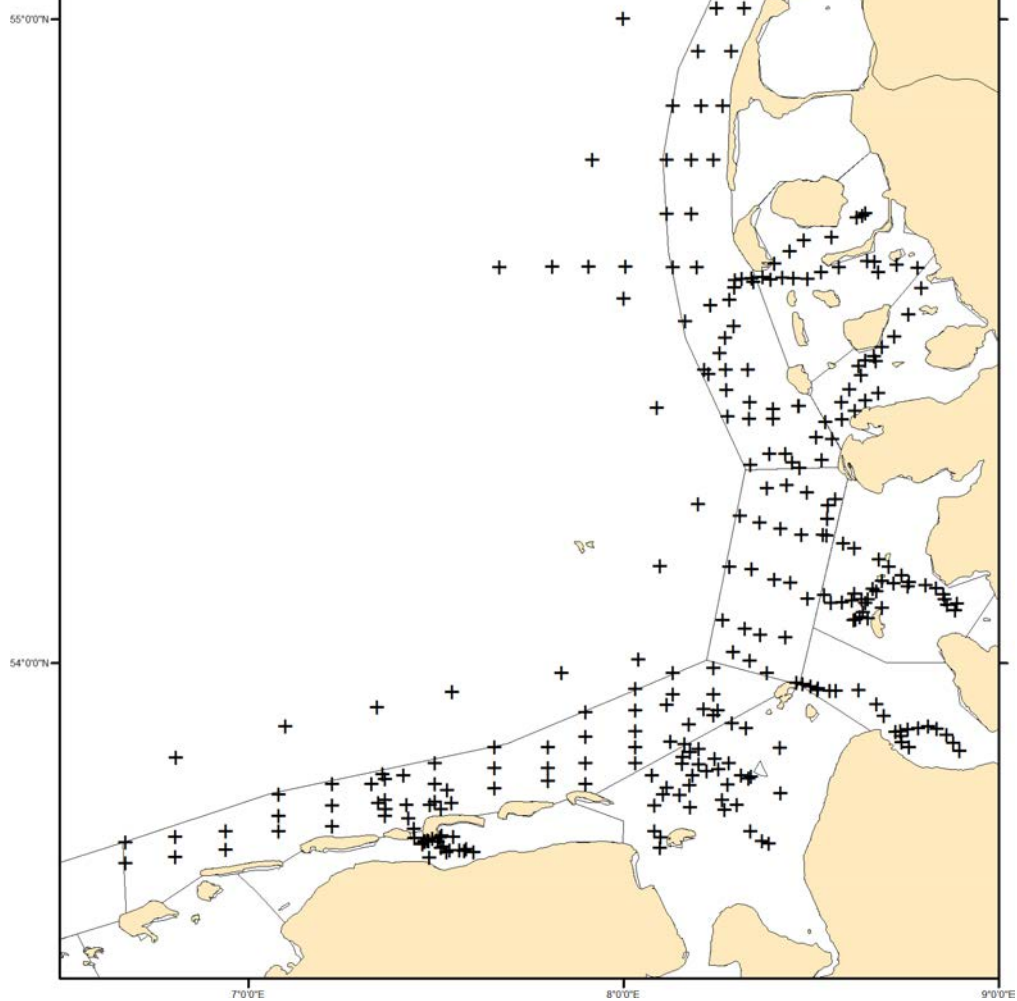
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

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>).

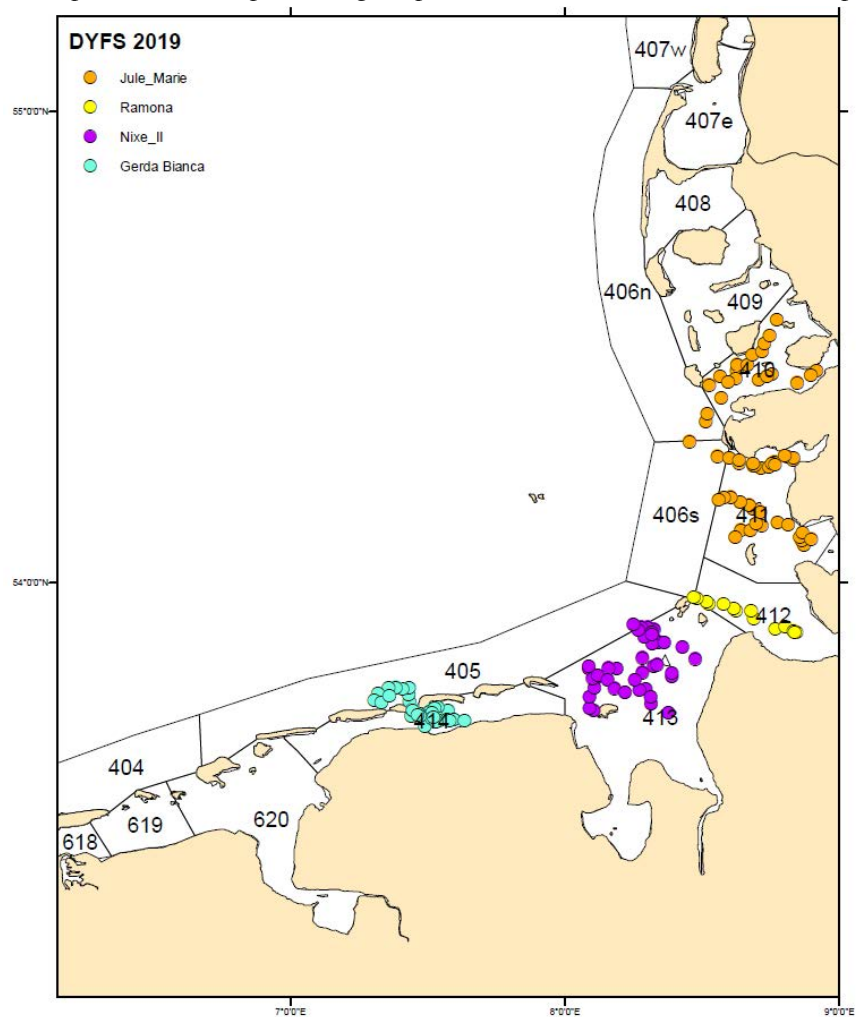
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Demersal Young Fish Survey (DYFS): Positions of fishing stations 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<https://www.ices.dk/community/groups/Pages/WGBEAM.aspx>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

survey index for plaice, abundance estimates, biological data for brown shrimp and plaice in ICES sub-area IV, environmental status

8. Extended comments (Tables 1G and 1H)

none

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)

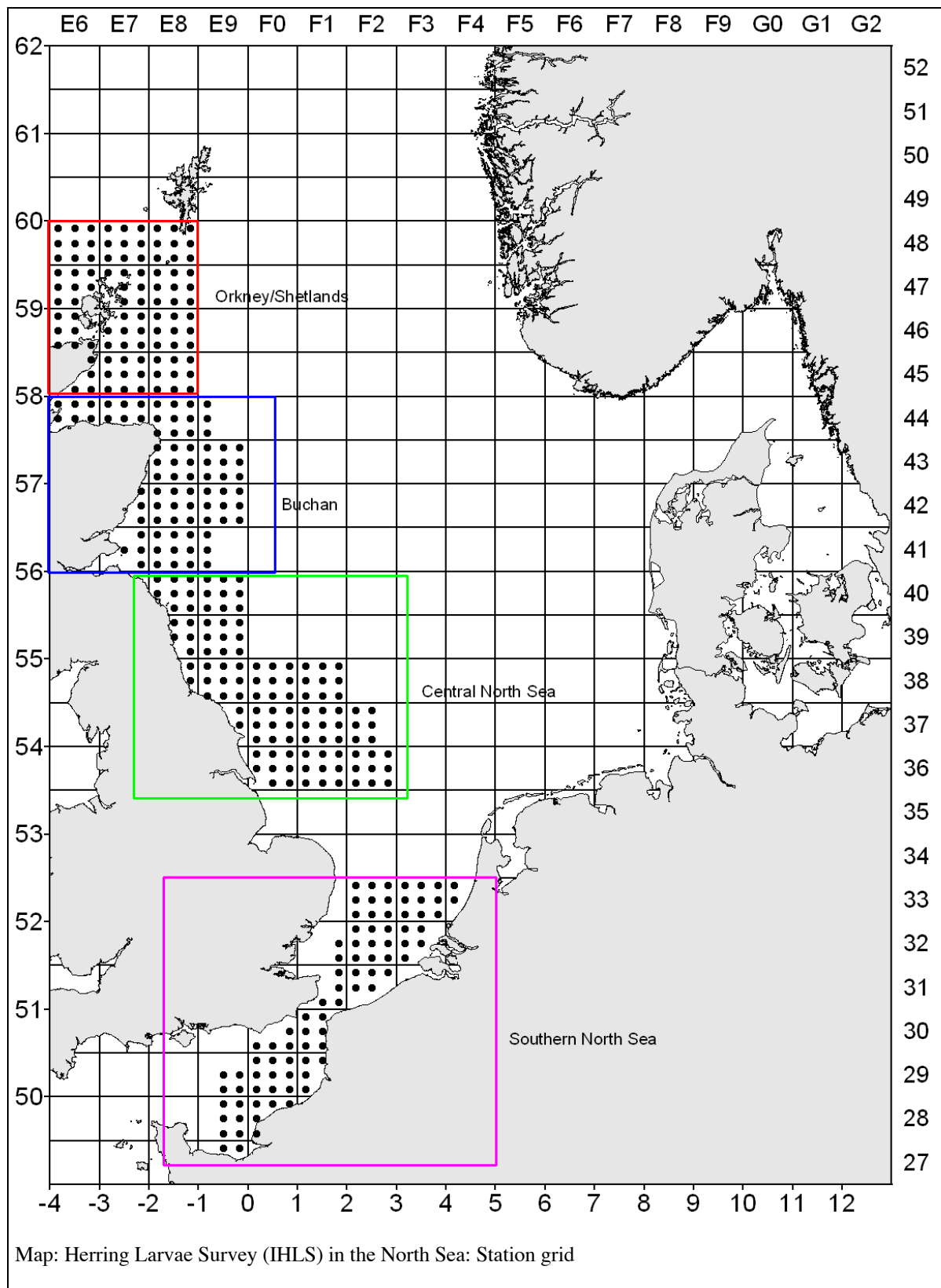
Herring larval abundance is surveyed at the major herring spawning grounds in the North Sea, e.g. in the Orkney/Shetland area, the Buchan region, the Central North Sea and the Southern North Sea. Standard gears are high-speed GULF samplers, deployed in a double oblique manner to near the sea bed and 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 m² at each station is used to calculate mean numbers of larvae per m² 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.

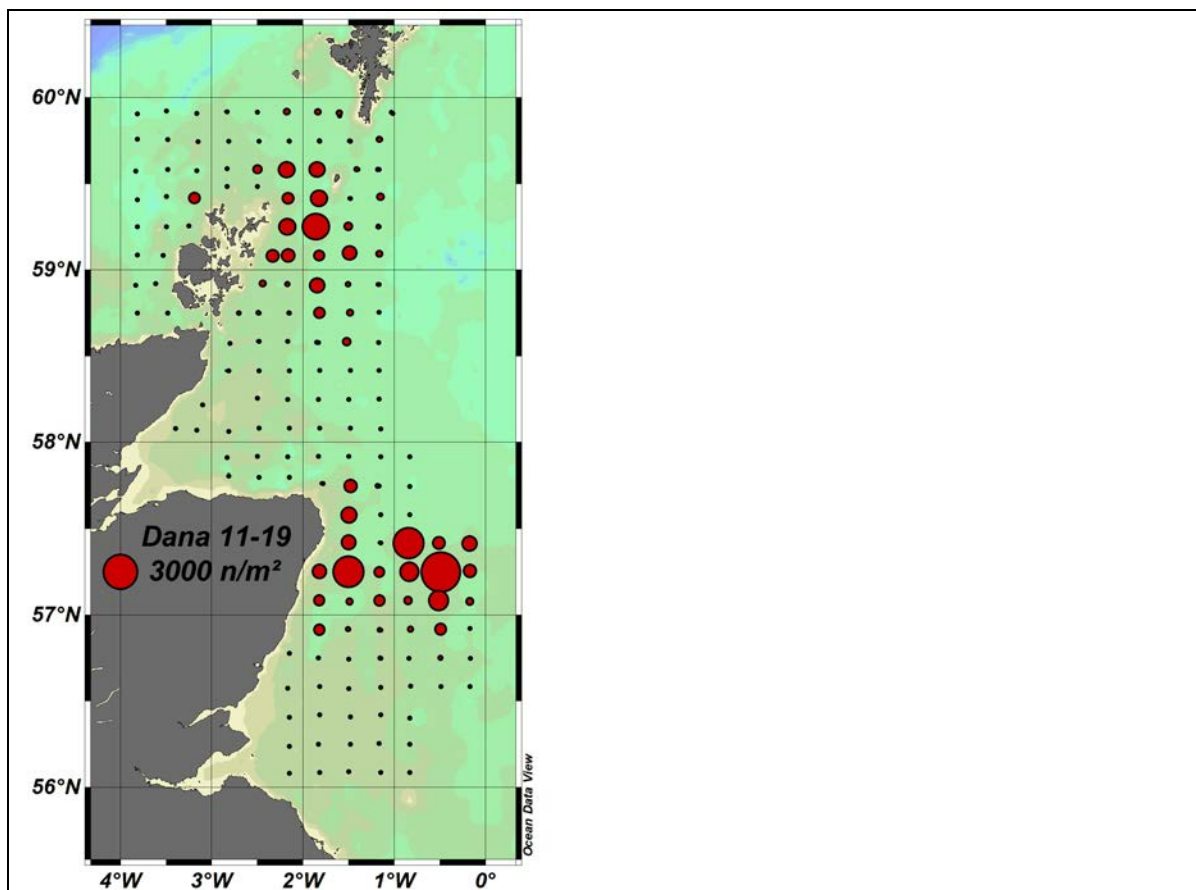
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

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 Surveys on Ichthyoplankton in the North Sea (WGSINS).

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 WGSINS. 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: Realized plankton stations 2019.

5. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

The parental committee WGSINS has met in October 2019. The latest report is available here: ICES. 2020. ICES Working Group on Surveys on Ichthyoplankton in the North Sea and adjacent Seas (WGSINS; outputs from 2019 meeting). ICES Scientific Reports. 2:17. 33 pp. <http://doi.org/10.17895/ices.pub.5969>

6. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The survey provides SSB indices on herring spawning components and their dynamics in the North Sea. These data are used in the international ICES Herring Assessment Working Group. Information on fish eggs and larvae, e.g. taxa, abundance and distribution, is used on national basis.

7. Extended comments (Tables 1G and 1H)

none

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:

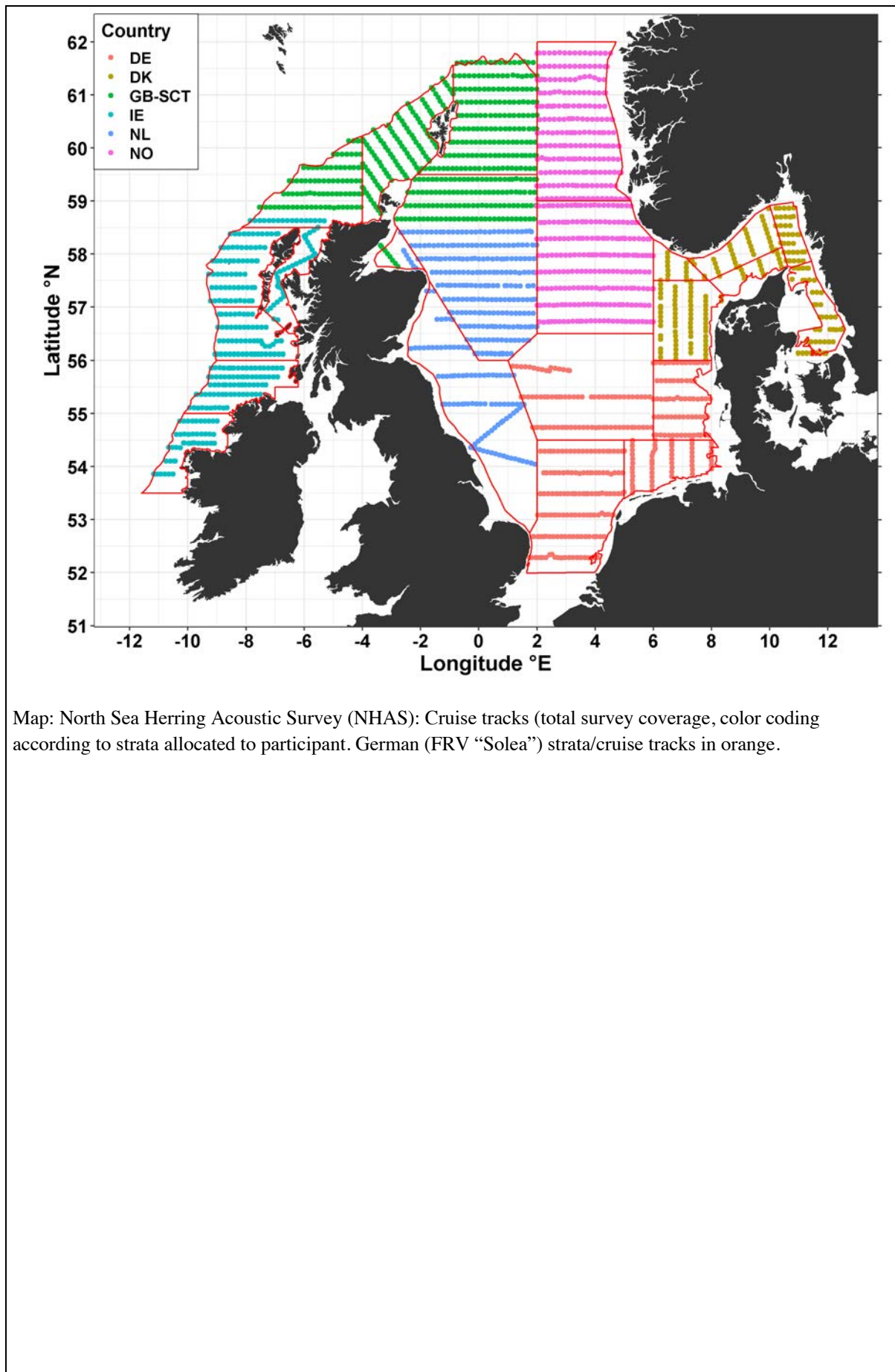
[https://www.ices.dk/sites/pub/Publication Reports/ICES Survey Protocols \(SISP\)/SISP 9 Manual for International Pelagic Surveys \(IPS\).pdf](https://www.ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/SISP%209%20Manual%20for%20International%20Pelagic%20Surveys%20(IPS).pdf)

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

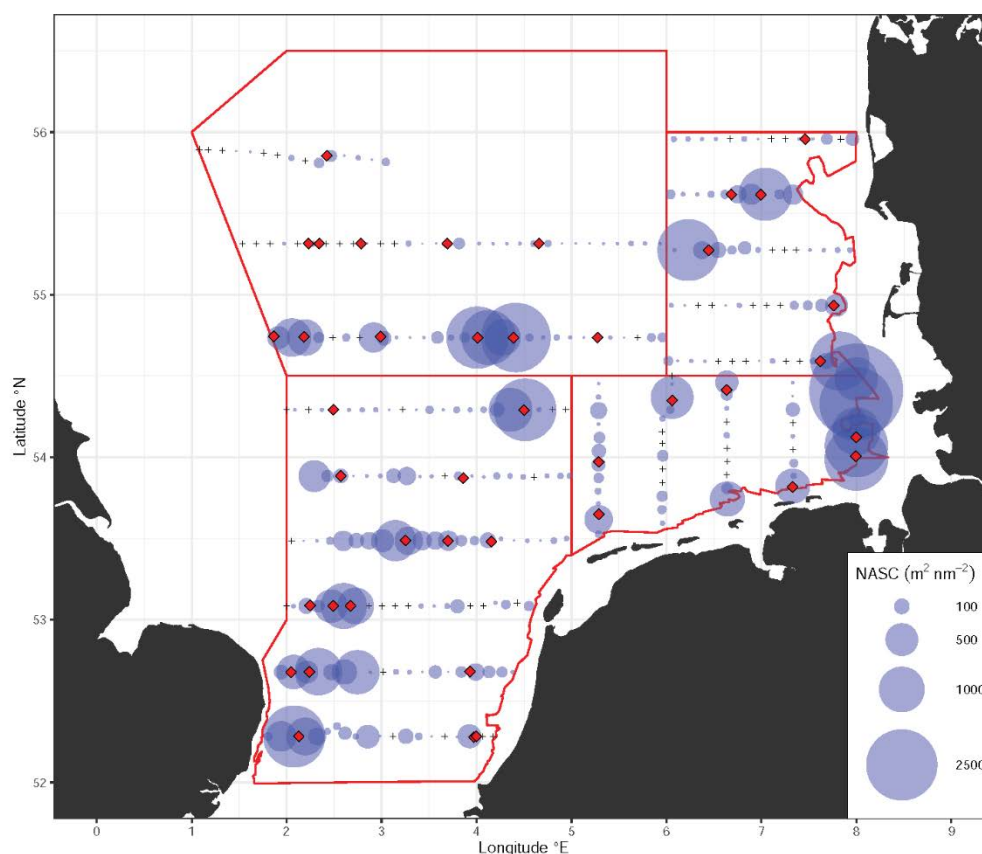
Participants (countries/vessels) of this internationally coordinated survey include: IRL (RV "Celtic Explorer"), SCO (RV "Scotia"), NOR (RV "Johan Hjort"), DEN (RV "Dana"), NED (RV "Tridens"), GER (FRV "Solea"). The survey is planned, coordinated and evaluated by the ICES Working Group of International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



5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: North Sea Herring Acoustic Survey (NHAS): German strata covered with FRV “Solea” in 2019. Mean NASC values measured along the cruise track (5 nmi intervals) and allocated to clupeids are depicted as bubbles (empty intervals indicated as +). Red diamonds: Directed (pelagic) trawl hauls.

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.
7. <http://ices.dk/sites/pub/PublicationReports/ExpertGroupReport/EOSG/2020/WGIPSreport2020.pdf>
8. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey results are used for the assessment of target species by the ICES Herring Assessment Working Group (HAWG) as fishery independent abundance indices.

9. Extended comments (Tables 1G and 1H)

none

International Deep Pelagic Ecosystem Survey (IDEEPS) – formerly called International Redfish Trawl and Acoustic Survey (REDTAS)

1. Objectives of the survey

This survey 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)

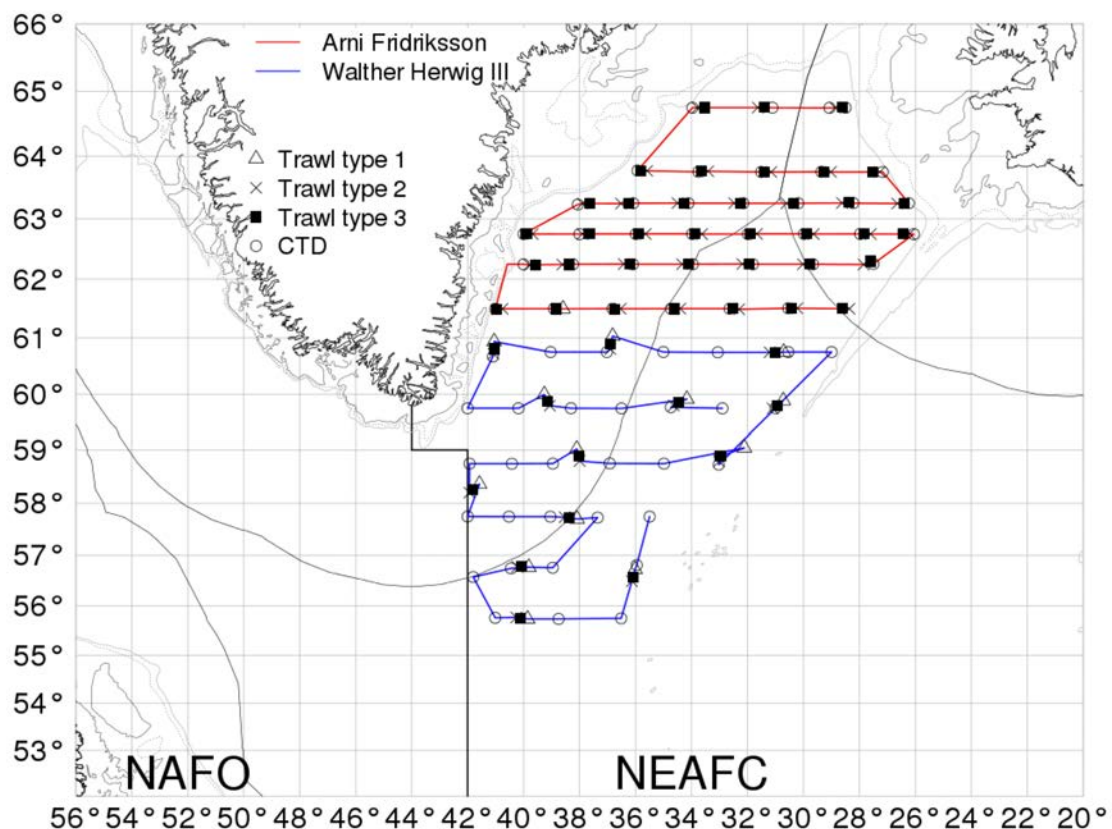
The international trawl/acoustic survey on pelagic redfish in the Irminger Sea and adjacent waters in June/July is carried out by two vessels from Germany and Russia. In the depth zone that can be surveyed by hydroacoustic measurements, i.e. shallower than the deep-scattering layer (DSL; down to about 350 m), hydroacoustic measurements and identification trawls are carried out. Within and below the DSL (down to about 500 m), redfish abundance is estimated by trawls. At depths below 500 m, redfish abundance is estimated by trawls at three depths layers (headline: 550 m, 700 m and 850 m). Biological samples 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” and by Russia (RV “Vilnyus”) and usually Iceland. In November 2017, Iceland informed the responsible survey planning working group that they would not participate in the survey in 2018. No specific reason was given. 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.



5. Graphical representation (map) showing the positions (locations) of the realized samples.
NA (next survey year: 2021)
6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.
<https://www.ices.dk/publications/library/Pages/default.aspx?k=wgideeps>
7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).
 - Provide survey biomass indices for the North Western Working Group (NWWG) to support advice on pelagic beaked redfish in the Irminger Sea and adjacent water;
 - Estimate the geographical and depth distribution and relative abundance of pelagic beaked redfish stocks;
 - Monitor changes in the stocks of pelagic beaked redfish independently of commercial fisheries data;
 - Collect data for the determination of biological parameters for beaked redfish stocks;
 - Collect hydrographical and environmental information;
 - Collect additional observations relevant to integrated ecosystem assessment in the area.
8. Extended comments (Tables 1G and 1H)
NA (next survey year: 2021)

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)

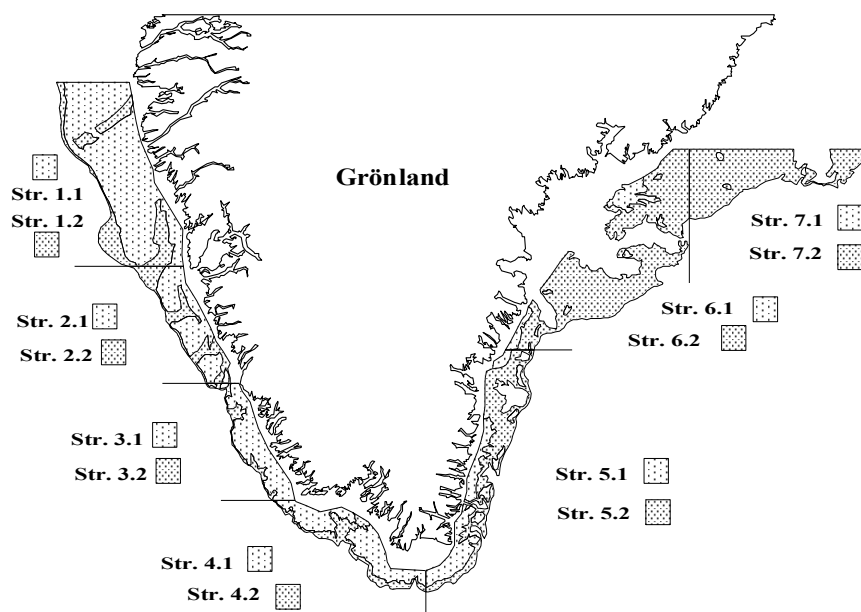
Demersal trawling, CTD casts and plankton sampling. Manual available at www.thuenen.de. The German groundfish survey started in 1982 and was primarily designed for the assessment of cod, but covers the entire groundfish fauna down to 400 m depth. It is carried out annually during the 4th quarter and 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-feet 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.

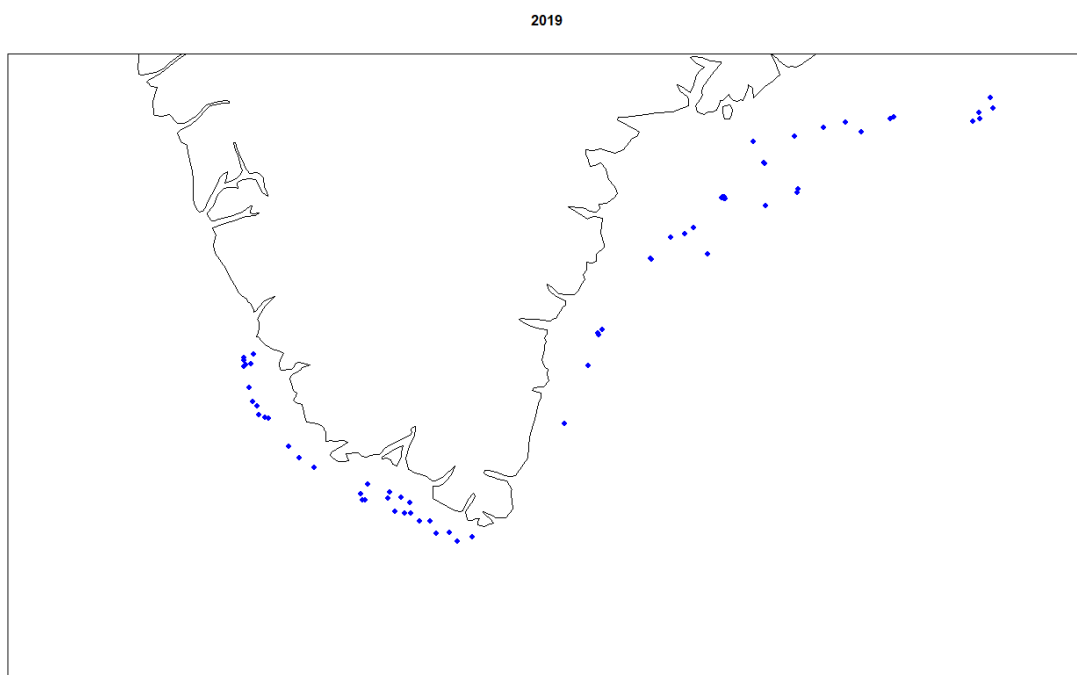
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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

5. Graphical representation (map) showing the positions (locations) of the realized samples.



German survey

Map: Greenland Groundfish Survey (GGS). Fishing positions 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<https://www.ices.dk/community/groups/Pages/NWWG.aspx>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Survey index for cod, survey index for redfish species for the assessment

8. Extended comments (Tables 1G and 1H)

none

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.

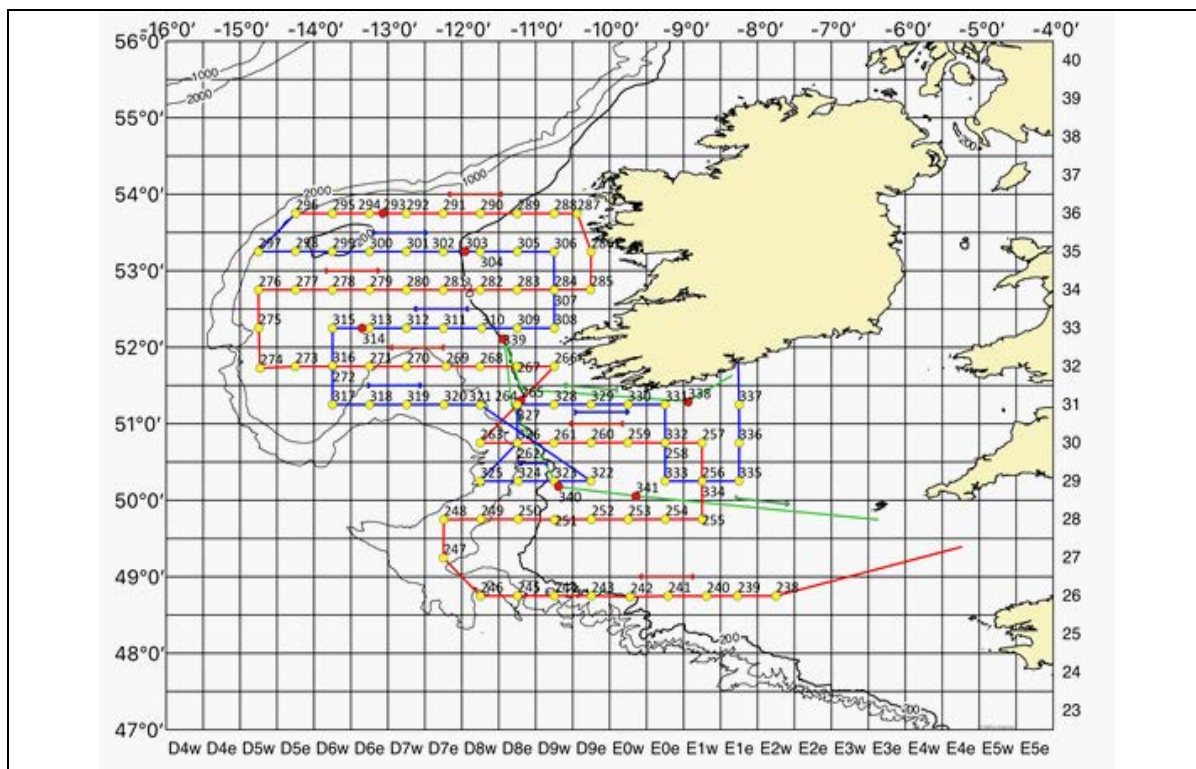
3. For internationally coordinated surveys, describe the participating Member States/vessels and the relevant international group in charge of planning the survey

Portugal: RV Noruega, Spain: RV Vizconde de Eza + RV Ramon Margalef + RV Emma Bardan (2016), The Netherlands: RV Tridens, Germany: FRV Walther Herwig III (in 2019 chartered danish RV "Dana"), 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).

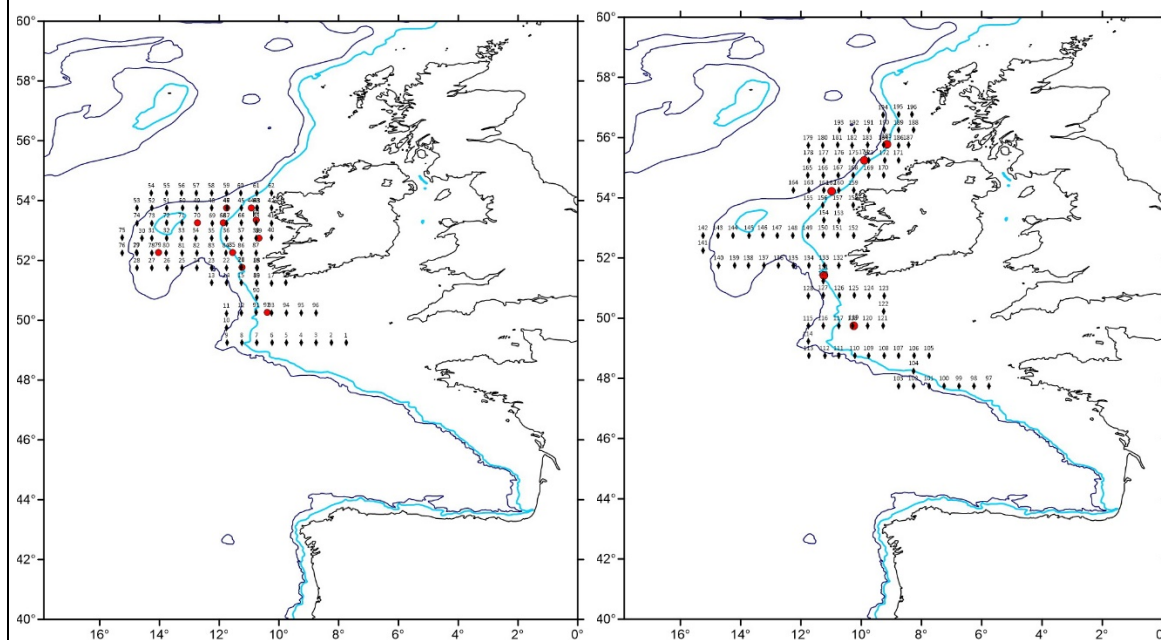
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

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)

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: RV "Dana" MEGS19, station grid in the 2 sampling periods (29th March to 12th April = left panel and 13th to 30th April = right panel); black diamonds = positions of plankton hauls; red circles = positions of fishing hauls

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<https://www.ices.dk/community/groups/Pages/WGMEGS.aspx>

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

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 used by ICES assessment group WGWIDE

8. Extended comments (Tables 1G and 1H)

none

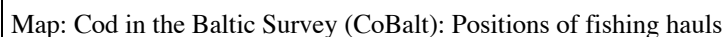
Cod in the Baltic (CoBalt)

Target species is Baltic cod. The main aim is to monitor the reproductive activities of 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 and flatfish stomachs are sampled in June 2019.

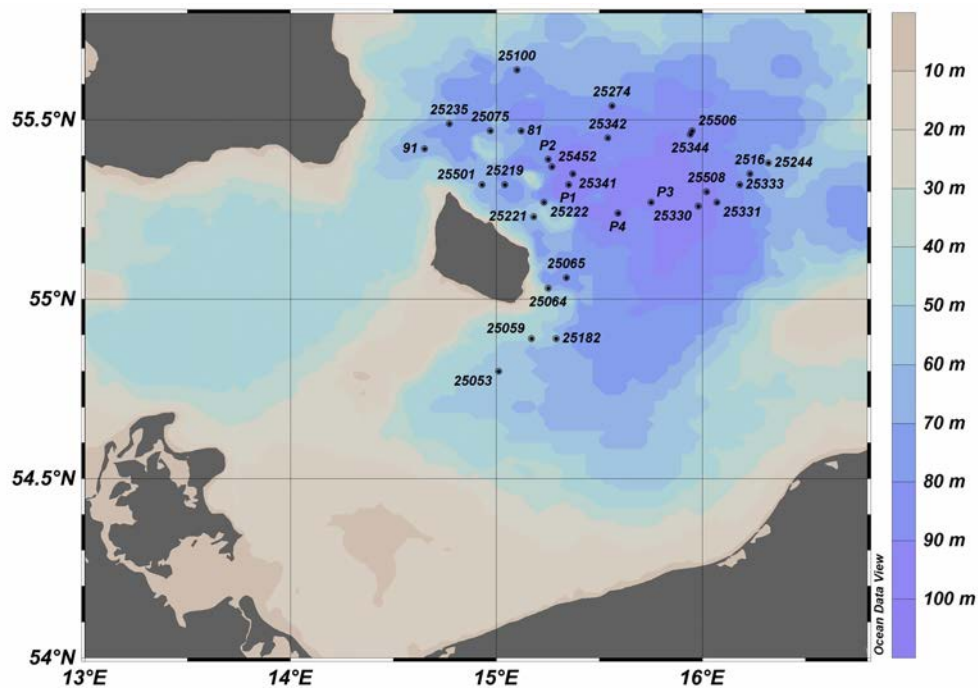
The used methods are standard BITS methods, which are described in the BITS survey manual: <http://www.ices.dk/community/groups/Pages/WGBIFS.aspx>

National survey only.

National survey only.



5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Cod in the Baltic Survey (CoBalt): Positions of fishing hauls in 2019; survey Solea 763, 11-23 June 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

https://www.bsh.de/DE/DATEN/Ozeanographisches_Datenzentrum/Durchgefuehrte_Forschungsfahrten/_Anlagen/Jahre/2018_node.html

see PDF annex

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

Target species are demersal fish species in the Baltic Sea, mainly cod. The aim of the survey is the sampling of data to maturation, condition and spawning of cod in relation to hydrography (salinity, temperature, oxygen) in the Bornholm Basin and the Arkona Sea.

8. Extended comments (Tables 1G and 1H)

none

National Bottom Trawl Survey in the Baltic (BaltBox)

1. Objectives of the survey

The purpose of this survey is the qualitative and quantitative recording of changes in distribution and composition of the demersal fish fauna in the German EEZ of the Baltic Sea. The sampling areas are located in ecologically characteristic areas ranging from Kiel Bay and Fehmarn Belt in the west via the deep Arkona Basin through to Adlerground and Oderbank in the east. Since 2018 only the most characteristic areas concerning spatio-temporal distribution of fish species are investigated: “West”, “Deep” and “East”. 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 stored in a national SQL database. In addition, cod stomachs were 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.

5. Graphical representation (map) showing the positions (locations) of the realized samples. In 2019 the survey was not conducted, see comment in table 1G for explanations.

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

-

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The main objective is to characterize the demersal fish fauna and their changes over time. Therefore, biodiversity indices, abundances and environmental parameters (e.g. salinity, temperature, oxygen saturation) were estimated, recorded and analysed.

8. Extended comments (Tables 1G and 1H)

The following publication resulted from the survey:

Rau A, Lewin W-C, Zettler ML, Gogina M, Dorrien C von (2019). Abiotic and biotic drivers of flatfish abundance within distinct demersal fish assemblages in a brackish ecosystem (western Baltic Sea). *Estuar Coast Shelf Sci* 220:38-47, DOI:10.1016/j.ecss.2019.02.035

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).

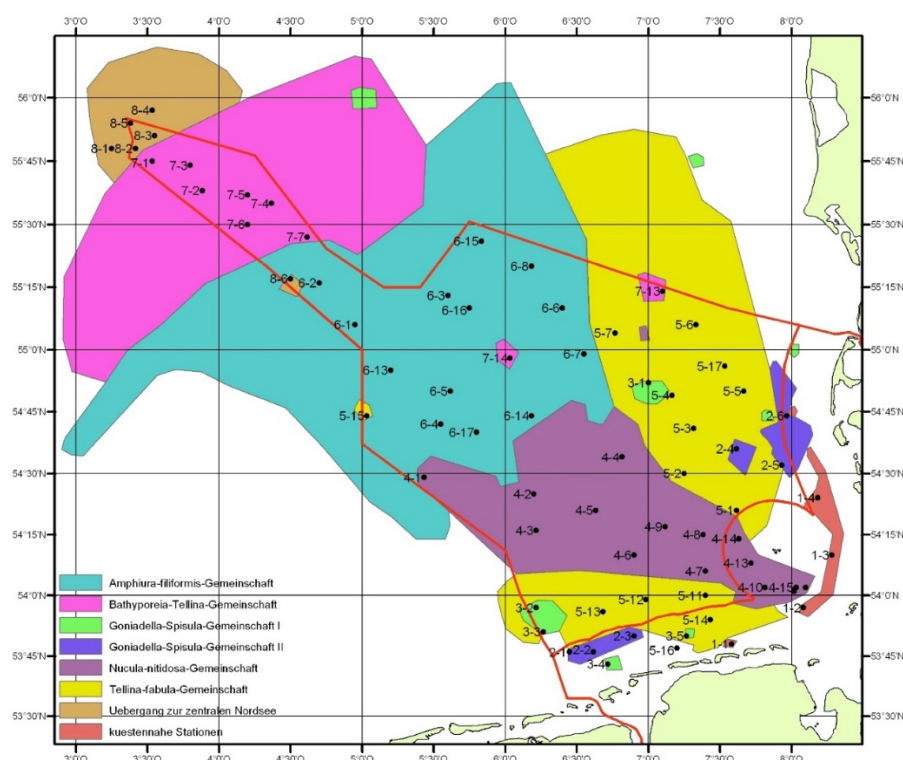
The data are so far stored locally in a national database.

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

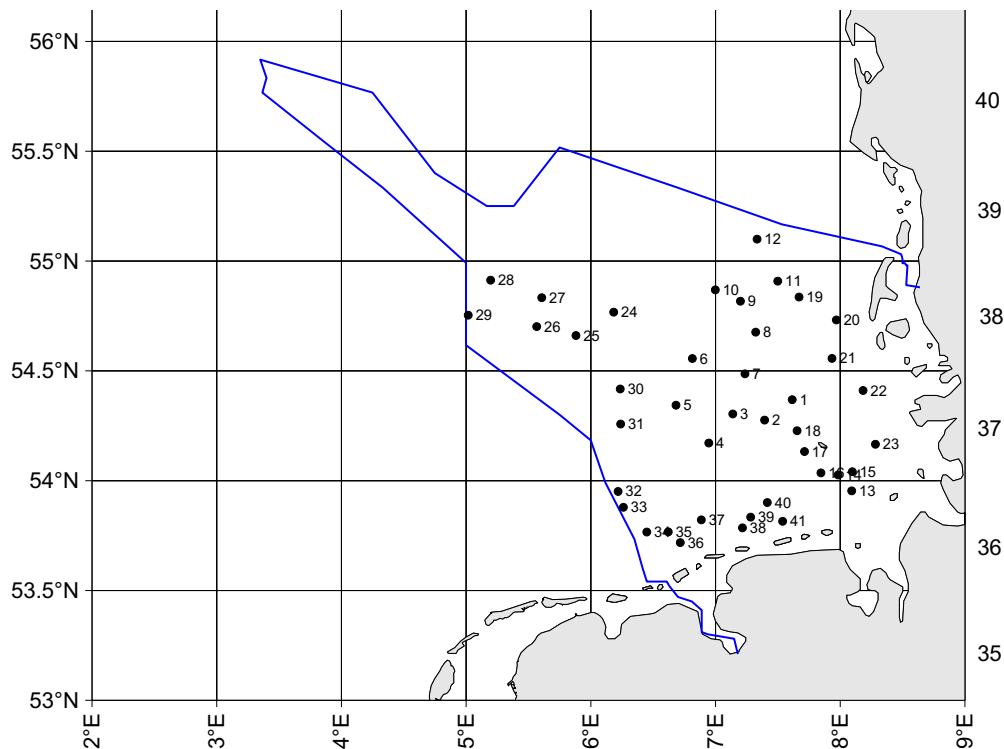
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only



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

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: German Autumn Trawl Survey (GAS EEZ) – Realized fishing hauls in 2019

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<http://www.bsh.de/aktdat/dod/fahrtergebnis/2018/20180108.htm>

see PDF annex

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

The survey provides information on the distribution and relative abundance of demersal fish species, monitors changes in the stocks of commercial fish species independently of commercial fisheries data and supplies information on the distribution and relative abundance of all fish species and invertebrates

8. Extended comments (Tables 1G and 1H)

none

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)

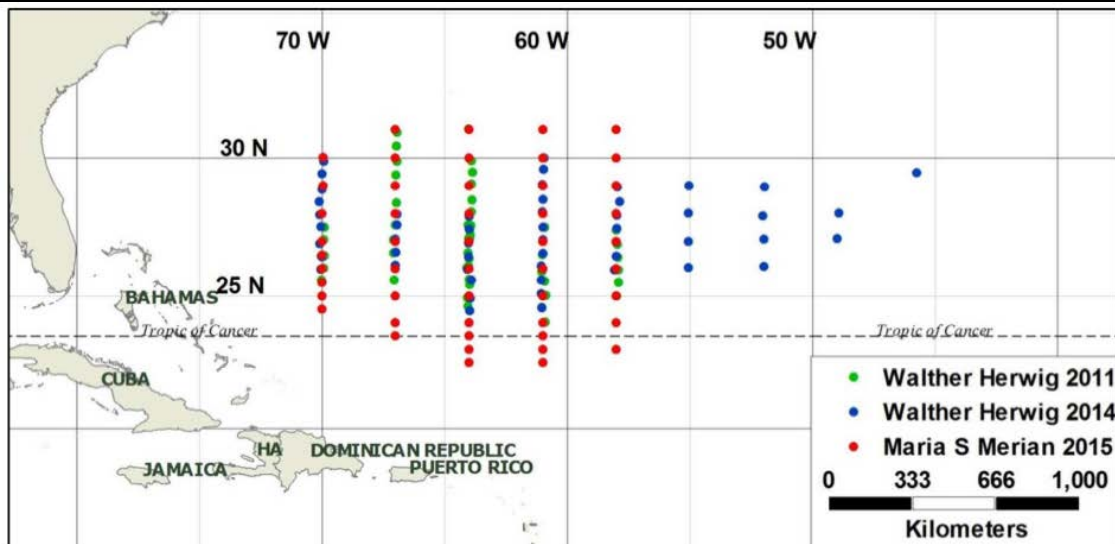
The study area ranges from 31° - 22°N and 70° - 50°W. Inside this area, a core sampling area is defined in accordance with larval distribution. Sampling takes place with an Isaac Kidd Midwater Trawl (net opening 6.3 m², mesh size 500 µm) at approximately 50 stations along north-south transects. Species 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

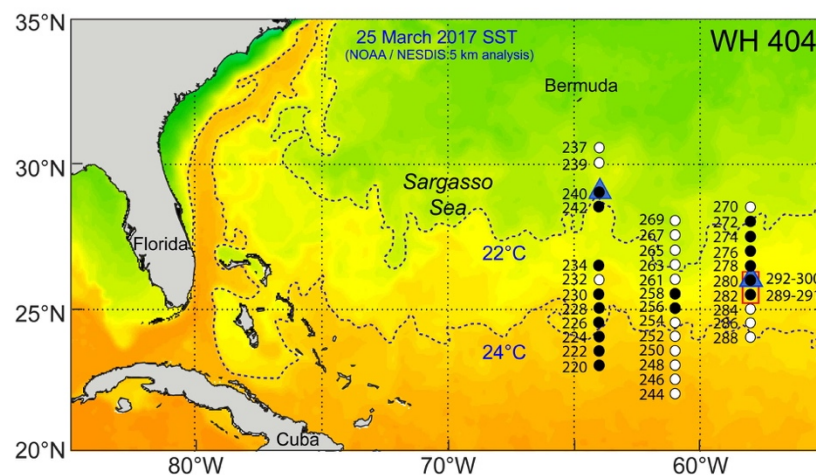
4. Where applicable, describe the international task sharing (physical and/or financial) and the cost sharing agreement used

National survey only



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

5. Graphical representation (map) showing the positions (locations) of the realized samples.



Map: Eel Larvae Survey, sampled transects in 2017

6. For internationally coordinated surveys, provide a link to the latest meeting report of the coordination group.

<http://www.bsh.de/aktdat/dod/fahrtergebnis/2017/20170155.htm>, next survey year is 2020

7. List the main use of the results of the survey (e.g. indices, abundance estimates, environmental indicators).

During the EELS-cruises, distribution and abundance of early life stages of eels (*Anguilla anguilla* and *A. rostrata*) are studied in the central Sargasso Sea. In the frame of a regular time series, the studies aim at enabling conclusions about the long-term effects of changing hydrographic conditions on distribution, abundance and survival of eel larvae in the Sargasso Sea. In the medium-term, the data shall offer relevant information for a successful and efficient management of this endangered fish species. Our catches of eel larvae, in combination with the oceanographic data obtained during the cruise, can also help to more precisely localize the spawning sites of European eel and to better understand the relevant abiotic factors in the spawning area.

In addition to the detailed work on eel larvae, we also investigate abundance and distribution of *leptocephalus*-larvae of other species, to detect potential changes in the *leptocephalus* community in the Sargasso Sea.

Beside the investigations of eel larvae, the behaviour of mature female eels in their presumed spawning area was investigated by using pop-up satellite tags in 2017. From this experiment, we expect data about the swimming behaviour of female eels short before spawning, including information about the spawning depth and hydrographic conditions at the spawning site.

The present research cruise is not understood as a stand-alone project. Instead, it represents a further step in our efforts to establish a continuous time-series of Sargasso Sea surveys, during which abundance and distribution of eel larvae as well as hydrographic conditions during the spawning period will be documented. By doing this, our studies provide a basis for a better understanding of the distribution of eel larvae and physical constraints for eels to spawn. By also conducting studies on related issues, e.g. trophic interactions, we further increase the knowledge about ecology of the youngest life stages of this fascinating, economically important but endangered species.

8. Extended comments (Tables 1G and 1H)

none

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 multiannual Union programme and Article 2, Article 4 paragraph (2) point (b) and Article 5 paragraph (2) of the Decision (EU) 2016/1701. 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.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the data collection of fishing activity variables of Member States.

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 métier. 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).

5. Deviations from Work Plan methodology used to cross-validate the different sources of data

No deviations.

Actions to avoid deviations.

NA

6. Deviations from Work Plan methodology used to estimate the value of landings.

No deviations.

7. Deviations from Work Plan methodology used to estimate the average price.

No deviations.

8. Deviations from Work Plan methodology used to plan collection of the complementary data

No deviations.

SECTION 3: ECONOMIC AND SOCIAL DATA

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

General comment: This box fulfils paragraph 5 points (a) and (b) of Chapter III of the multiannual Union programme and Article 2, Article 4 paragraphs (1), (2) and (5) and Article 5 paragraph (2) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Tables 5(A) and 6 of the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the fleet socio-economic data collection of Member States.

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 31st 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.

In case effort was recorded for “Other Fishing Regions”, but no vessel was assigned to “OFR”, the reason is that only a minor part of activities was executed in “OFR”.

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.

6. Deviations from Work Plan methodology for selection of data source

No deviations. In addition to the sources mentioned, subsidies were comprehensively provided by the federal institutions responsible for approval and payment.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

No deviations.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations.

10. Quality assurance

10.1 Sound methodology

The methodologies applied are in line with expert group recommendations (e.g. SGECA 09-02). Sampling schemes used are census and probability sampling. The methodologies applied are documented and being made publicly available in the National Work Plan, which is available e.g. under <https://www.dcf-germany.de/index.php?id=187>.

Specific information on the FADN-based data can be found at

<https://www.bmel-statistik.de/landwirtschaft/testbetriebsnetz/testbetriebsnetz-fischerei-buchfuehrungsergebnisse/>

10.2. Accuracy and reliability

Response rate and achieved sample rate are provided in Table 3A.

FADN-based data are additionally checked through an IT-based plausibility routine, comprising a comparison of numerous figures:

<https://www.bmel-statistik.de/landwirtschaft/testbetriebsnetz/testbetriebsnetz-landwirtschaft-buchfuehrungsergebnisse/plausibilitaetspruefung-landwirtschaft/>

Figures from additional surveys comprise about 50 questionnaires. Those are assessed manually, following principles similar to the FADN plausibility routine, though being shorter (as the FADN contains many more variables than required for EU MAP). In principle, values are checked by the individual GVA – datasets are further scrutinised when the GVA is sensibly negative. In some cases, one-time expenses are an explanation (e.g. repair). If expenses substantially exceed a typical percentage of the value of landings, then the data will be cross-checked with the supplier, when regarded relevant.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

<https://www.dcf-germany.de/index.php?id=187>

<https://www.bmel-statistik.de/landwirtschaft/testbetriebsnetz/testbetriebsnetz-fischerei-buchfuehrungsergebnisse/>

<https://www.bmel-statistik.de/landwirtschaft/testbetriebsnetz/testbetriebsnetz-landwirtschaft-buchfuehrungsergebnisse/plausibilitaetspruefung-landwirtschaft/>

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 multiannual Union programme and Article 2 and Article 3 paragraph (3) point (c) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Table 6 of the multiannual Union programme.
General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).
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.
4. Achievement of the original expected outcomes of pilot study and justification if this was not the case. The pilot study was executed in 2018. . 5. Incorporation of results from pilot study into regular sampling by the Member State. The data collected through the pilot study and the data sources will be used for regular sampling in the future. Some adjustment to the number of engaged crew will be implemented for consistency reasons in the future.

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 multiannual Union programme and Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Tables 6 and 7 of the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.

1. 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 m³ (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 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.

Destatis (2016) Finanzen und Steuern. Umsatzsteuerstatistik (Voranmeldungen) 2014. German Federal Statistical Office (Destatis), Fachserie 14 (8.1), Destatis, Wiesbaden.

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>

6. Deviations from Work Plan methodology for selection of data source

In case of the variable “persons employed”, the primary data source has altered from survey to census data from National Labour Agency (BA). BA data has turned out as better source, because it considers all

employees. However, the allocation towards the single segments trout/carp/mussel is still based on survey data.

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

As described in the last two Annual Reports, the original planned two-stage sampling process (cluster of main important aquaculture federal states and probability sampling) including the planned threshold could not be applied, as the Thünen Institute has no access to freshwater fish farmers' addresses combined with information about cultured species and volume (cf. Text Box 3B of the 2017 Annual Report). The alternative database used has listed 748 freshwater aquaculture enterprises at the beginning. Due to new information from respondees, the established address database has been cleansed. Several entries were deleted, because the addresses were invalid or interviewees had objections according to the Data Protection Regulation (EU 2016/679). On the other hand, new research results on business entries have been included into the database. Further and due to the high share of small enterprises in the 2018 responses, in 2019 smallest enterprises (production unit <200m³ or 0.3ha), which obviously are not profit-orientated, have been released from the survey. In consequence, the Thünen Institute received only 103 responses in 2019, which is almost one third less than in 2018.

9. Deviations from Work Plan methodology used for estimation procedures

The data on unpaid labour has been corrected in the survey 2019 retrospectively and the share of unpaid labour is now available.

10. Quality assurance

10.1 Sound methodology

The methodologies applied are in line with expert groups recommendations (e.g. SGECA 09-02). Sampling schemes used are census and probability sampling. The methodologies applied are documented and being made publicly available in the National Workplan, which is available e.g. under <https://www.dcf-germany.de/index.php?id=187>.

Regarding data on aquaculture production volume per species, production techniques (segments), number of farms cf. National Statistic Agency (Destatis) "Qualitätsbericht. Erhebung über die Erzeugung in Aquakulturbetrieben, 30. August 2017, Wiesbaden. (<https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Land-Forstwirtschaft-Fischerei/einfuehrung.html> (access on 05/05/2020; only available in German))

Regarding data on permanent and casual employment, apprenticeships, gender and origins of employees cf. labour register of the National Employment Agency (Bundesagentur für Arbeit, March 2020).

<https://statistik.arbeitsagentur.de/cae/servlet/contentblob/4412/publicationFile/858/Qualitaetsbericht-Statistik-Beschaeftigung.pdf> (access on 05/05/2020; only available in German)

10.2. Accuracy and reliability

To synthesise the surveys for freshwater aquaculture and marine aquaculture, all questionnaires have been sent at the beginning of September 2019 at once. Response rate and achieved sample rate per variable are provided in Table 3B.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

<https://www.dcf-germany.de/index.php?id=187>

(<https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Land-Forstwirtschaft-Fischerei/einfuehrung.html> (access on 05/05/2020; only available in German))

<https://statistik.arbeitsagentur.de/cae/servlet/contentblob/4412/publicationFile/858/Qualitaetsbericht-Statistik-Beschaeftigung.pdf> (access on 05/05/2020; only available in German)

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 multiannual Union programme and Article 2 and Article 4 paragraph (3) point (d) of the Decision (EU) 2016/1701. It is intended to specify data to be collected under Table 8 of the multiannual Union programme.
General comment: This box is applicable to the Annual Report. This box is intended to provide information on the results obtained from the implementation of the pilot study (including deviations from planned and justifications as to why if this was not the case).
1. <i>No data collection planned due to threshold (see background text at the beginning of Text Box 3B).</i>
4. Achievement of the original expected outcomes of pilot study and justification if this was not the case. -
5. Incorporation of results from pilot study into regular sampling by the Member State. -

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 fulfils footnote 6 of paragraph 1.1(d) of Chapter III of the multiannual Union programme, Article 2, Article 4 paragraphs (1) and (5) and Article 5 paragraph (2) of Decision (EU) 2016/1701. It is intended to specify data to be collected under Table 11 of the multiannual Union programme.
General comment: This box is applicable to the Annual Report. This box should provide information on the implementation of the socio-economic data collection for aquaculture of Member States.
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.

Destatis (2016) Beschäftigte, Umsatz und Investitionen der Unternehmen und Betriebe des Verarbeitenden Gewerbes sowie des Bergbaus und der Gewinnung von Steinen und Erden, Fachserie 4 Reihe 4.2.1 - 2014 Destatis, Wiesbaden.

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

6. Deviations from Work Plan methodology for selection of data source

After the first contacts in the pilot study, and given the low response rate, it was decided to focus on the data from the best available data source: a cooperating firm, leader of the industry and with a comprehensive, electronic data record. The low willingness to deliver data remains, nevertheless this stronger cooperation would allow further improvements in the methodology. In addition to this, the collection of data from national statistical sources was improved through cooperation with a national research project (see deviations from methodology below).

7. Deviations from Work Plan methodology to choose type of data collection

No deviations.

8. Deviations from Work Plan methodology regarding sampling frame and allocation scheme

The pilot study had low response rate despite reminders, and it was further conducted using a case study with a cooperating industry leader presenting comprehensive data. This case study allowed the exploration of the “best case scenario”. The cooperation with a national research project also presented the opportunity to improve the methodology for the use of national statistical data on the origin of raw materials. The national project englobed not only the origin, but also the use of fish as raw material, which could contribute to advancing in possible uses of the data for traceability analyses.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations

10. Quality assurance

10.1 Sound methodology

The methodologies applied are in line with expert group recommendations (e.g. SGECA 09-02). 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 the Federal Employment Agency’s (ARGE) data collection on employment is conducted via census. Sampling schemes used are census, probability and non-probability sampling. For the census and probability sampling to DESTATIS and ARGE, the response rate is particularly good as delivery of data is compulsory for the firms. The methodologies applied are documented and made publicly available in the National Work Plan, which is available e.g. under <https://www.dcf-germany.de/index.php?id=187>. For the pilot study, the methodology has been developed in cooperation with the SECFISH project and will be available in the project documentation. Further extensions to the methodology have been performed using a case study, among others to reduce the burden on respondents.

Specific information on the already existing data collections by the Federal Statistical Office and the Federal Employment Agency data can be found at:

ARGE (2018) Sozialversicherungspflichtig Beschäftigte nach ausgewählten Wirtschaftszweigen der WZ 2008. German Federal Employment Agency, internal report, Nürnberg, August, 2018.

Destatis (2019) Beschäftigte, Umsatz und Investitionen der Unternehmen und Betriebe des Verarbeitenden Gewerbes sowie des Bergbaus und der Gewinnung von Steinen und Erden, Fachserie 4 Reihe 4.2.1 – 2019 Destatis, Wiesbaden.

Destatis (2019) Kostenstruktur der Unternehmen des Verarbeitenden Gewerbes, Fachserie 4 Reihe 4.3 – 2019 Destatis, Wiesbaden.

10.2. Accuracy and reliability

Response rate and achieved sample rate are provided in Table 3C.

Since enterprises with 20 and more employees are responsible for more than 90% of sector's sales and employment, low response rates in the segments with fewer employees do not affect the results in terms of representation of the sector eminently. The data collected represent between 80% and 100% of the sector's total sales. The exceptions are data for debt and net value of assets. Here, the willingness to provide data voluntarily differs distinctly. As in all former years, data for debt are calculated from the interest payment of the enterprises, taking market interest rates for enterprises. Then it is compared to the data from those enterprises that have provided data, to check if the amount is in an appropriate range and otherwise adapted to the values from the sample, as in the years before. Different company sizes are taken into account by a weighting factor, based on the sales volume.

Data from the German Federal Statistical Office (Destatis) on cost are available through the annual "Report on the cost structure of Processing Trade" which is released each June (year n) and which refers to year (n-2). Thus in 2019, data on 2017 have been collected. This is in accordance with the STECF 14-24 (Preparations for future data collection under the revised DCF) report suggesting the rules for procedures under the EU MAP.

10.3. Accessibility and Clarity

Are methodological documents publicly available? Yes

Are data stored in databases? Yes

Where can methodological and other documentation be found?

<https://www.dcf-germany.de/index.php?id=187>

<https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Industrie-Verarbeitendes-Gewerbe/Publikationen/Downloads-Struktur/beschaeftigte-umsatz-investitionen-2040421177004.html>

<https://www.destatis.de/DE/Themen/Branchen-Unternehmen/Industrie-Verarbeitendes-Gewerbe/Publikationen/Downloads-Struktur/kostenstruktur-2040430167004.html>

<https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Industrie-Verarbeitendes-Gewerbe/kostenstruktur-verarbeitendes-gewerbe.html>

<https://www.unternehmensregister.de/ureg/result.html;jsessionid=026F2ADDE15882DF80064ECD45D055E1.web02-1>

Text Box 4A: Sampling plan description for biological data

General comment: This box fulfills Article 3, Article 4 paragraph (4) and Article 8 of the Decision (EU) 2016/1701 and forms the basis for the fulfilment of paragraph 2 point (a)(i) of Chapter III of the multiannual Union programme. This Table refers to data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme.

General comment: This box is applicable to the Annual Report. This box should provide information on the deviations from the planned sampling of Member States.

1. General remark

Germany is conducting two approaches for the North Sea / North Atlantic (Institute of Sea Fisheries, Bremerhaven) 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. 6b 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: 1st and 3rd 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 2nd and 3rd 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 4th quarter; Herring – 3rd 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: 3rd/4th 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: 2nd/3rd 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: 2nd/3rd 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 2018 are compiled 2017 with data from 2016). 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 200-300 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 and their spatio-temporal dynamics. In addition, opportunistic sampling of landed discards (BMS cod under the landing obligation) may take place.

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 are 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).

Deviation from the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701:

2. Deviations from the Work Plan

Baltic Sea:

The planned number of 30 PSU for “Baltic herring active 2224” given in the previous Work Plan was corrected to a realistic number of 10 PSU. A PSU of 30 must have been a wrong entry. A PSU of 30 is completely unrealistic because our national sampling scheme of the landings in the herring processing plant in Neu-Mukran usually does not exceed 14 samples in a year. The sampling scheme closely follows the fishery, which usually takes place between November and April. Given a bi-weekly sampling with 1 sample in a given week, we can expect 10-12 samples a year. Therefore, we changed the planned number of PSU to 10.

On 22 July 2019, the European Commission issued an immediate measure to protect the cod stock of the eastern Baltic Sea (COM Impl. Reg. 2019/1248). The immediate measure resulted in a massive decrease in fishing trips of German trawlers on eastern Baltic cod in SD25. At the same time, in SD24 additional sampling was directed to the German demersal fleet to closely monitor the effects of the immediate measure.

North Sea and Eastern Arctic:

Arctic 1 – (Factory trawlers)

Target species: Saithe and cod. Peak season: 1st and 3rd quarter. Area: Northeast Arctic waters. Duration of trips: 4 weeks to 3 months. Sampling effort: 2 observer trips were planned but only 1 trip was carried out. In 2019, it was not possible to place an observer onboard a fishing trip within the 3rd quarter due to logistic reasons indicated by the vessel owner.

North Sea 1 – (Small beam trawlers)

Target species: Brown shrimp. Peak season: March to October with peaks in the 2nd and 3rd quarter. Area: German North Sea coastal waters. Duration of trips: 1 to 3 days. Sampling effort: 8 observer trips were planned but only 5 trip were carried out. 2 trips in summer were not carried out because the German fishery decided to stop fishing during 2 months due to market strategic reasons. One additional trip could not be carried due to technical problems of the vessel and it was not possible to arrange a replacement trip.

North Sea 3

Target species: Gadoids, mainly saithe, in ICES areas 4 and 3a. Peak season: All year around. Area: Northern North Sea. Duration of trips: 7 to 10 days. Sampling effort: 6 observer trips were planned, only 3 trips could be carried out. The saithe targeting fishery could not be covered in the 1st quarter 2019 due to sick leave of the assigned observer. In addition, we failed to place an observer on the cod targeting fishery in summer due to staff shortage.

Target species: Flatfish. Peak season: All year round. Area: Central and southern North Sea. Duration of trips: 5 to 8 days. Sampling effort: 2 observer trips were planned, only 1 trip could be carried out. Due to changing fishing behaviour, we missed one trip in 2019.

3. Action to avoid deviations

For the North Sea and East Arctic and the North Atlantic region: Based on the list of fishing vessels supplied by the Federal Agency for Agriculture and Food (BLE), Germany is always aiming at reaching a wide participation of vessels in the observer programme and including vessels which have not been sampled by observers before. Although this is partially successful, there are always vessel owners, of smaller vessels in particular, who are not willing to allow observers onboard. In the high-seas fisheries, there are only a few vessels and the fishing trips have a duration of up to 3 months. Here, it is often logistically difficult to place an observer out of the available pool on board, simply because of holidays, sickness etc. Based on the

present situation, random sampling of the fleet is not fully implemented. This leads somewhat to an opportunistic sampling strategy, taking sampling opportunities when they occur, irrespective if they are planned or not. Other deviations occurred because of short-notice changes in the fishing behaviour. When more or other than the planned trips were carried out, opportunities for samplings were taken which arose due to contacts with the fishing industry.

Although article 12(2) of Reg. 2017/1004 stipulates that “*the masters of Union vessels shall accept on board scientific observers and cooperate with them*” and the Federal fisheries research institutes hold a co-operation agreement with the German Fisheries Association, this situation remains to be difficult for some metiers.

Germany, however, was participating in the MARE/2014/19 project “Strengthening regional cooperation in the area of fisheries data collection” (FishPi), where regional statistically sound sampling schemes were tested. We were also involved in the FishPi2 project, which develops practical recommendations for regional sampling plans.

In 2019, the German catch sampling schemes were evaluated externally. Preliminary results suggest that the current sampling efforts, given the constraints already explained above, cannot be improved to a large extent. One of the recommendations is to focus on regional coordination and adaptation towards sampling the main fisheries more intensely and release sampling effort by task-sharing with other countries.

Regarding other deviations from the Work Plan, please refer to Text Box 1C.

SECTION 5: DATA QUALITY

Text Box 5A: Quality assurance framework for biological data

General comment: This box is applicable to the Annual Report. This box fulfills Article 5 paragraph (2) point (a) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 1(A), 1(B) and 1(C) of the multiannual Union programme. Use this box to provide additional information on Table 5A.

1. Evidence of data quality assurance

NA

2. Sampling design

NA

3. Sampling implementation

NA

4. Data capture

NA

5. Data Storage

NA

6. Data processing

Presently, we do not evaluate bias and precision of our data, since we are not aware of routine tools available for such estimates on a national level. However, data accuracy evaluation processes (bias and precision) are currently undergoing internal reviews, as the database holding the commercial sampling data is being updated and processes and routines are improved. Documentation will be given together with the new version of the database.

SECTION 5: DATA QUALITY

Text Box 5B: Quality assurance framework for socioeconomic data

General comment: This box fulfills Article 5 paragraph (2) point (b) of the Decision (EU) 2016/1701. This box is intended to specify data to be collected under Tables 5(A), 6 and 7 of the multiannual Union programme. Use this box to provide additional information on Table 5B.

Within this section MS shall provide information on the methodology used to assure the quality of the data collected, highlighting those aspects where changes have been made during the sampling year. Information shall be provided by each sector (Fishing fleet, Aquaculture, Fish processing) for which data was collected and by each data collection scheme. In the case where the same quality assurance framework is applied to all sectors or/and all data collection schemes, information can be provided at general level with the indication “all sectors” or “all data collection schemes”.

In those sections of Table 5B where “N” is indicated, Member States shall explain the main constraints and/ or the steps taken to fulfil this obligation. In the cases where a reference documents is requested, Member States shall provide a web link.

In cases where documents are not publicly available, due to institutions internal policy, confidentiality or other reasons, this shall be indicated by the Member State.

1. Evidence of data quality assurance

NA

2. Section P3 Impartiality and objectiveness

Explain main constraints and/ or steps taken, if ‘N’ (no) was indicated in Table 5B

NA

3. Section P4 Confidentiality

Explain main constraints and/ or steps taken, if ‘N’ (no) was indicated in Table 5B

In case of data collection through questionnaires no other DCF partner is involved, i.e. the issue is not applicable. The same applies to external users. There are no constraints as consequence.

4. Section P5 Sound methodology

Explain main constraints and/ or steps taken, if ‘N’ (no) was indicated in Table 5B

Information on this principle should be briefly explained in Text boxes 3A, 3B and 3C. Description of methodologies used on data quality.

Sound methodology is now documented for the pilot study, in cooperation with the project SECFISH, and will be available with the project documentation.

5. Section P6 Appropriate statistical procedures

Explain main constraints and/ or steps taken, if ‘N’ (no) was indicated in Table 5B. Please provide a link if the documented revisions are available and not confidential.

NA

6. Section P7 Non-excessive burden on respondents

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B

NA

7. Section P8 Cost effectiveness

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B

NA

8. Section P9 Relevance

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B

The survey by questionnaire is aimed to fulfil EU MAP requirements in combination with the other "data collection schemes". There are no specific end users of the survey by questionnaire other than the end users of EU MAP data. Therefore there are no constraints as consequence.

9. Section P10 Accuracy and reliability

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B. Information on this principle should be briefly explained in Text boxes 3A, 3B and 3C. Description of methodologies used on data quality.

NA

10. Section P11 Timeliness and punctuality

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B

For the pilot study information on timeliness and punctuality will be available as the pilot study is completed and the subsequent survey put in place

11. Section P12 coherence and comparability

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B

The internal coherence and time comparability of information on the origin of raw material have been further developed through a national project on the origin and dependence on biological raw materials.

12. Section P13 Accessibility and Clarity

Explain main constraints and/ or steps taken, if 'N' (no) was indicated in Table 5B. Information and links to documentation on this principle should be briefly explained in Text boxes 3A, 3B and 3C. Description of methodologies used on data quality.

NA

ANNEX

Survey report of non-mandatory surveys

Note: The National Bottom Trawl Survey in the Baltic (BaltBox) and the Eel Larvae Survey were not carried out in 2019.

Bericht
über die 763. Reise des FFS Solea
vom 11.06. bis 22.06.2019

Untersuchungen zur Laicherbestandsstruktur, zum Anteil aktiver Laicher,
zu Kondition und Laichaktivitäten und zur Reifeentwicklung von Dorschen
in Beziehung zur hydrographischen Situation in der Bornholmsee und
Arkonasee (COBALT)

Fahrtleitung: M. Bleil

Das Wichtigste in Kürze

Der Fokus der Untersuchungen lag in der Abschätzung der aktuellen reproduktiven Aktivitäten von Dorschen in der Bornholmsee und der Arkonasee in Beziehung zur hydrographischen Situation.

Im Bornholmbecken ist aktuell, wie auch bereits im Vorjahr, ab einer Wassertiefe von ca. 63 m die erfolgreiche Reproduktion von Dorschen nicht mehr möglich. Es wurden unterhalb dieser Wassertiefe deutlich unterkritische Sauerstoffwerte (< 2 ml/l) beobachtet. Aufgrund dieser Situation war am Boden des Bornholmbeckens kein Fisch. Im zentralen Becken der Bornholmsee wurden bei Wassertiefen von 62 - 70 m schwache pelagische Anzeigen von Dorschen beobachtet und befischt.

Die erzielten Einheitsfänge von Dorsch waren in der Bornholmsee ein wenig höher als im Vorjahr. Der Trend zur Abnahme des Durchschnittsgewichtes der gefangenen Dorsche seit 2016 hält weiter an und ist mit 220 g nochmal deutlich niedriger als in den Vorjahren, Tiere mit Längen von > 40 cm wurden lediglich in Einzelexemplaren gefangen.

Die Auswertungen der Reifegradverteilung ergaben, dass in der Bornholmsee 93 % der potentiellen männlichen Laicher und 85 % der potentiellen weiblichen Laicher am diesjährigen Laichen teilnehmen werden, obwohl der Laicherbestand sich weiterhin vorwiegend aus Erstlaichern zusammensetzt. Es laichten bereits 67 % der Tiere. Das kleinste laichende Tier hatte eine Länge von 17 cm. Es dominierten Tiere der Längengruppen 20 – 36 cm. Auch in der Arkonasee, im Tiefenbereich ab 40 m, wurden laichende Dorsche beobachtet. Aufgrund der beobachteten Längen- und Reifeverteilung liegt die Hypothese nahe, dass sich hier ein hoher Anteil von Dorschen aus der Beltsee zur Nahrungssuche aufhielt.

Verteiler:

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Schiffsführung FFS „Solea“
Fahrtteilnehmer
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TI, Präsidialbüro (M. Welling)
TI, Verwaltung Hamburg
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2 AUFGABEN DER FAHRT

Im Verlauf der Reise war laut Fahrtprogramm vorgesehen Untersuchungen zu Laichaktivitäten, zur Struktur der Laicherbestände, ihrer Reifeentwicklung und Kondition, zur makroskopischen Parasitierung und zu den Nahrungspräferenzen von Dorschen im Seegebiet der Bornholmsee durchzuführen. Kurzfristig musste, aufgrund des Ausfalles der Baltbox Reise, das Fahrtgebiet auf die Arkonasee ausgedehnt werden.

Routinemäßig sollten alle in den Fängen vorkommenden Fischarten erfasst werden. Seltene Arten waren bei vorhandenem Überlebenspotenzial wieder in die See zurück zu setzen. Das Fahrtprogramm sah vor, auf jeder Fischereistation fischereibiologisch relevante, hydrographische Parameter zu messen. Für das LALLF/MV sind, den Vorgaben entsprechend, verschiedene Fischarten und Organproben für Schadstoffuntersuchungen konserviert worden.

3 FAHRTVERLAUF UND DURCHGEFÜHRTE ARBEITEN

FFS "Solea" wurde am 11.06.2019 in Rostock aufgerüstet und lief planmäßig gegen 13.00 Uhr mit Ziel Bornholmsee aus. Die fischereilichen Arbeiten begannen am 12.6. in der südlichen Bornholmsee mit zeitlicher Verzögerung wegen Sturm aus NO mit bis zu 8 bft. Nach Auswertung der ersten fischereilichen und hydrographischen Daten wurde am 14.6. von Grundschieppnetz auf pelagische Fischerei umgestellt. Dazu musste das gesamte Fanggeschirr abgeschlagen und ein neues, pelagisches Fanggeschirr angeschlagen werden, was einige Zeit in Anspruch nahm. Am Spätnachmittag des 16.6. ist ein erneuter Wechsel des Fanggeschirres erforderlich, da flachere Stationen das Vorkommen von Fisch am Boden vermuten lassen.

Bis zum 17.6. sind sämtliche in der Bornholmsee beantragte und genehmigte Stationen befischt worden.

Die erfolgreiche Fischerei in der Bornholmsee war schwierig, weil die Zielfischart Dorsch auf einigen, flacheren Stationen am Boden, auf den meisten Stationen im Pelagial beobachtet wurde. Da FFS „Solea“ nur über eine Netztrommel verfügt, konnte eine, der Situation permanent angepasste, Fischerei nicht realisiert werden. Ein Netzwechsel von Station zu Station ist nicht möglich. Ein Netz, das sowohl im Pelagial als auch am Boden eingesetzt werden kann, ist nicht vorhanden. Die Konstruktion und Beschaffung eines solchen Fanggerätes erscheint in Anbetracht der Situation in der Ostsee dringend erforderlich.

Nach Beendigung der Fischerei in der Bornholmsee verholte FFS „Solea“ in die Arkonasee um hier noch weitere, kurzfristig in das Fahrtprogramm integrierte, Stationen zu bearbeiten. Die fischereilichen Arbeiten wurden am 21.6. gegen 14.00 Uhr erfolgreich beendet.

FFS „Solea“ lief am 22.6. 2019 gegen 06.45 Uhr den Hafen von Rostock-Marienehe zum Abrüsten an, um dann zügig die Fahrt nach Cuxhaven fort zu setzen.

4 ERSTE ERGEBNISSE

4.1 Fischerei

Während der Reise wurde sowohl das Standard - Grundschieppnetze TV 3/520 sowie, in Abhängigkeit von der hydrographischen Situation am Boden des Bornholmbeckens, das pelagische Netz PSN 388 eingesetzt. Die Holdauer lag bei 0,25 – 0,5 h. Die Aufarbeitung der Fänge erfolgte gemäß BITS Standards.

Die Sammlung der Daten/Proben fand schwerpunktmäßig in der Bornholmsee und zusätzlich in der Arkonasee statt. Es sind insgesamt 48 Hols durchgeführt worden.

Im Verlauf der Reise wurden insgesamt 312 495 Fische gefangen und davon 21 427 gemessen. Es sind 4953 kg (16 224 Stk) Dorsch gefangen und davon 9176 Tiere gemessen worden. Es waren in der Bornholmsee die Längengruppen 8 – 60 cm und in der Arkonasee 5 – 63 cm vorhanden.

In der Bornholmsee dominierten die Längengruppen 20 – 36 cm und in der Arkonasee 25 – 40 cm (Abb. 1).

Die erzielten Einheitsfänge von Dorsch (kg/h; Stück/h) waren in der Bornholmsee erneut sehr niedrig, wenn auch leicht höher als im Vorjahr:

2019	-	183	kg/ 830 Stk
2018	-	155	kg/ 519 Stk
2017	-	286	kg/ 944 Stk
2016	-	292	kg/ 757 Stk
2015	-	886	kg/ 2535 Stk

Im zentralen Becken der Bornholmsee wurden bei Wassertiefen von 62 - 70 m schwache, aber anhaltende pelagische Anzeigen von Dorschen beobachtet, die mit dem PSN 388 befischt wurden.

Neben Dorsch waren zahlenmäßig in den Fängen Scholle, gefolgt von Hering und Sprotte regelmäßig vorhanden. Flunder sowie Wittling kamen ebenfalls häufig in den Fängen vor, wobei der Anteil an Flunder im Vergleich zu den Vorjahren deutlich abgenommen hatte. Insgesamt sind 24 verschiedene Fischarten gefangen worden.

Darüber hinaus ist, entsprechend Anforderung, Probenmaterial für das LALLF MV gesammelt und eingefroren worden.

4.2 Biologische Untersuchungen

Für die biologischen Untersuchungen sind 1451 Dorsche für die Untersuchungen zur Reifeentwicklung und zur Laichaktivität in Beziehung zur Kondition analysiert worden.

Die vorläufigen Auswertungen der Reifegradverteilung von Dorschen zeigen, dass in der Bornholmsee 93,1 % der potentiellen männlichen Laicher und 84,9 % der potentiellen weiblichen Laicher am diesjährigen Laichen teilnehmen werden, obwohl der Laicherbestand sich weiterhin überwiegend (62 %) aus Erstlaichern zusammensetzt. Es laichten (Reife 6 und 7) im Reisezeitraum bereits 67% des potentiellen Laicherbestandes. Das kleinste laichende Tier hatte eine Länge von 17 cm.

Der Trend zur Abnahme des Durchschnittsgewichtes der gefangenen Dorsche seit 2016 hält weiter an und ist mit 220 g nochmal deutlich niedriger als in den Vorjahren (299 g – 2018; 303 g - 2017; 385 g – 2016).

Die Auswertungen zur Kondition der Dorsche in Beziehung zu ihrer Länge zeigen für die Tiere mit Längen < 35 cm keine markanten Veränderungen zum Vorjahr (Abb.2). Für Laicher ab 35 cm hat sich die Kondition verschlechtert und große Tiere (> 40 cm) sind nur noch in Einzelexemplaren mit einer sehr schlechten Kondition beobachtet worden (Abb.2).

Auch in der Arkonasee wurden Laichaktivitäten beobachtet. Es laichten 23 % der Dorsche. Aufgrund der beobachteten Längen- und Reifeverteilung liegt die Hypothese nahe, dass sich im Seegebiet, zum Reisezeitraum, ein hoher Anteil von Dorschen aus der Beltsee zur Nahrungssuche aufhielt. Das unterstreicht die Bedeutung dieses Gebietes als Mischgebiet beider Bestände.

Wie auch bereits während der Laichzeit der „Frühjahrslaicher“ im März in der Beltsee wurde in der Arkonasee gezielt untersucht ob es auch für die „Sommerlaicher“ eine Abhängigkeit der Laichaktivitäten von der Wassertiefe gibt. Die Analysen zur Tiefenstratifizierung bestätigen die Ergebnisse aus dem Vorjahr. Die Laichaktivitäten (Reife 6+7) in der Arkonasee konzentrieren sich auf den Bereich mit Wassertiefen von mehr als 40 m (Tab. 2).

4.3 Hydrographie

Für die hydrographischen Messungen kam die Seabird Sonde SBE19V- 4603 im online-Betrieb zum Einsatz.

Es sind 49 hydrographische Tiefenprofil-Messungen durchgeführt und 39 Wasserproben gewonnen worden. In Tabelle 3 ist ein Überblick zu den maximalen und minimalen Messwerten im Tiefenhorizont kurz über Grund und an der Wasseroberfläche angegeben. Die homogene, schwach saline Deckschicht im zentralen Becken der Bornholmsee lag zwischen 40 bis 50 m. Auf der Station mit der höchsten Wassertiefe (93,5 m) im Bornholmbecken betrug die Wassertemperatur 2,5 m über dem Boden 8,6 °C, bei einem Salzgehalt von 17,0 ppt und einem Sauerstoffgehalt von 0,08 ml/l (Tab. 2). Im Bornholmbecken war ab einer Wassertiefe von ca. 62 - 72 m (im Durchschnitt 66,3 m) die erfolgreiche Reproduktion von Dorschen nicht mehr möglich. Es wurden unterhalb dieser Wassertiefe deutlich unterkritischer Sauerstoffwerte (<2 ml/l) beobachtet. Die potentiell reproduktive Schicht für Dorsch hatte im Vergleich zum Vorjahr (ca. 4 m) wieder zugenommen und lag bei durchschnittlich 16 m (minimal 7,7 m bis maximal 24 m).

5 FAHRTTEILNEHMER:

- | | |
|---------------------|------------------|
| • Martina Bleil | Fahrtleitung |
| • Titus Rohde | TA |
| • Sven Dressler | TA |
| • Christina Waitkus | TA/Fotografie |
| • Marcel Bächtiger | stud. Hilfskraft |
| • Nadja Gerull | stud. Hilfskraft |

6 DANKSAGUNG

Herrn Kapitän V. Koops und seiner Besatzung möchte ich meinen herzlichen Dank aussprechen für die allumfassende Unterstützung bei der Erfüllung des Reiseprogrammes und für die angenehme und aufgeschlossene Arbeitsatmosphäre an Bord. Gleichzeitig danke ich allen Mitgliedern der wissenschaftlichen Arbeitsgruppe für ihr großes Engagement bei der Erfüllung der umfangreichen Arbeitsaufgaben.

gez. M. Bleil
Fahrtleitung

ANHANG

Tab.1: Reifeverteilung (%) nach Geschlecht [Aktive = Reife 3-8; Ruhe = Reife 1-2]

Gebiet	25		24	
Sex	Aktive	Ruhe	Aktive	Ruhe
1	93,1	4,7	36,0	61,5
2	84,9	14,6	24,6	36,0

Tab. 2: Laichaktivitäten von Dorschen (%) in der Arkonasee in Beziehung zur Wassertiefe

Wassertiefe	20 - 30 m	31 - 40 m	41 - 46 m
	N = 69	N = 69	N = 59
Reife			
Ruhe (1-2)	98	97	7
Vorlaichreif (3-5)	2	0	14
Laichend (6-7)	0	0	80
Abgelaicht (8)	0	1,5	0

Tab. 3: Hydrographische Messungen an der Oberfläche und in der Fischereitiefe in der Bornholmsee und Arkonasee

	SD 25		SD 24	
	Oberfläche	Bodennähe	Oberfläche	Bodennähe
Temperatur (°C)	13,2 – 15,5	5,7 – 8,7	15,0 – 21,0	8,2 – 17,4
Salinität (ppt)	7,4 – 7,7	12,0 – 17,0	7,1 - 8,0	7,9 – 16,0
Sauerstoffgehalt (ml/l)	7,1 – 7,4	5,4 - 0,07	6,4 – 7,3	3,5 – 6,6

Abb. 1: Totallängenhäufigkeitsverteilung Dorsch (Anzahl in Stk.) in der Bornholmsee (N=5917) und der Arkonasee (N=3253) im Juni 2019

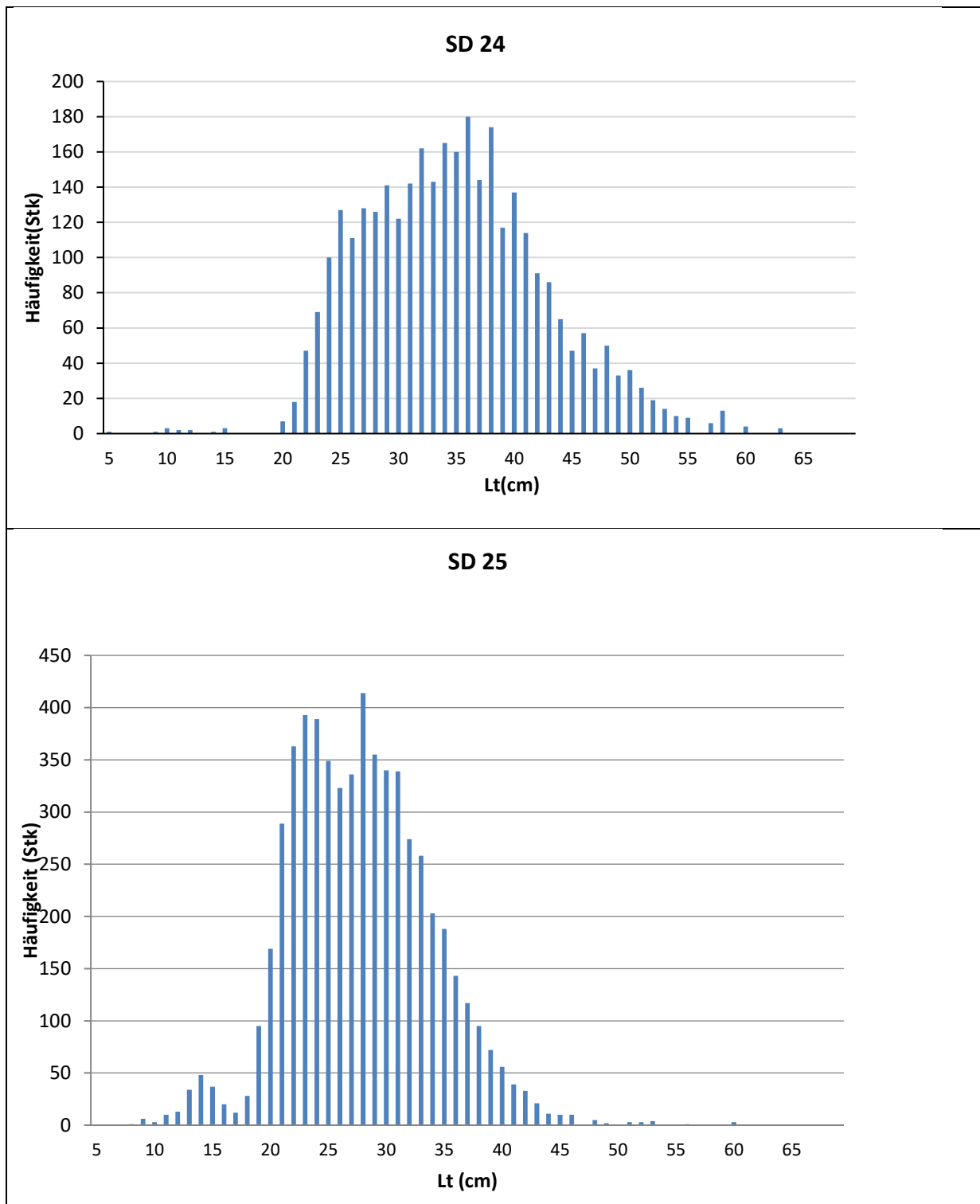
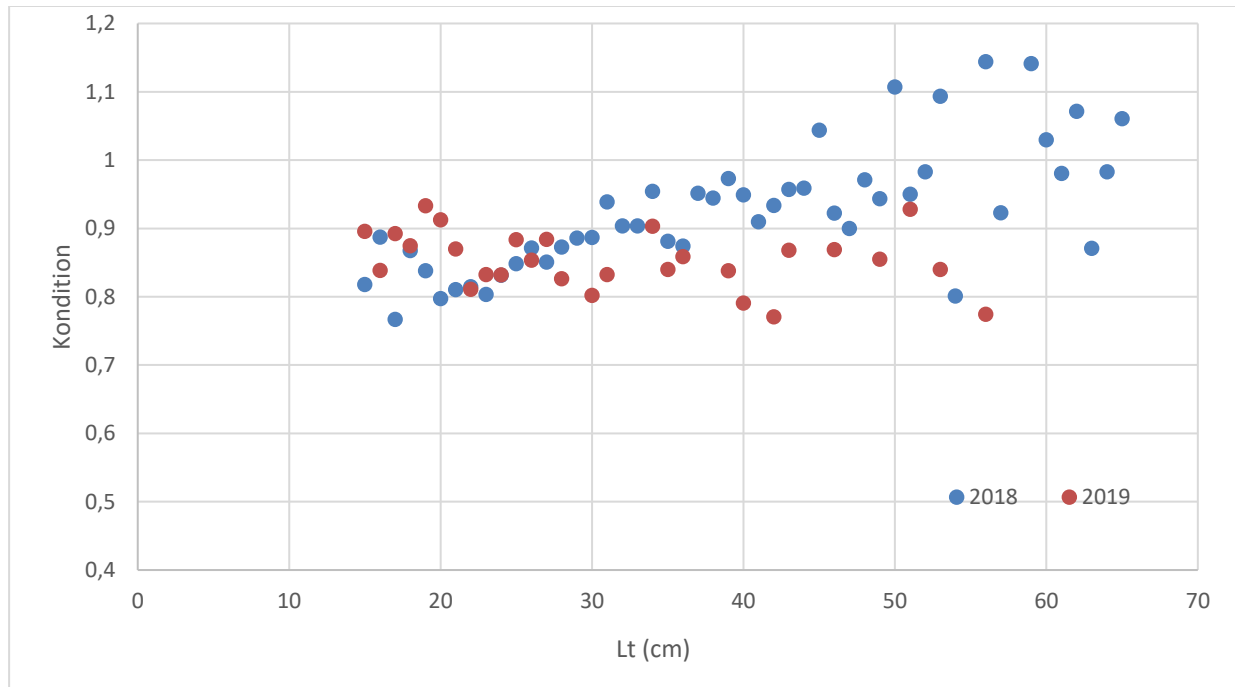


Abb.2: Vergleich der Kondition von Dorschen in der Bornholmsee, im Juni der Jahre 2018 und 2019



Cruise Report 771 FRV Solea

Cruise Leader: Kay Panten

Summary

The purpose of this trip was again the qualitative and quantitative recording of the demersal fish fauna in the German Exclusive Economic Zone (EEZ) of the North Sea. In conjunction with the results of investigations of the benthic invertebrate fauna of other research institutes possible changes due to increasing industrialization (wind farms, sand and gravel extraction) are to be detected. The entire EEZ was divided into different ecological zones and covered with a fixed station network. Since the investigation began in 2004, an annual exchange between the beam trawl and bottom trawl maintained. This year the investigations were therefore carried out again with the beam trawl.

A total of 38 fish species and 52 invertebrate species were detected in the 40 carried out hauls with the beam trawl. The fish were dominated by species dab, plaice, whiting, solenet and scadfish. The catch of invertebrates consisted mainly of starfish, swimming crabs and hermit crabs.

Verteiler:

TI - Seefischerei

Deutscher Hochseefischerei-Verband e.V.
DFFU

per E-Mail:

BMEL, Ref. 614

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Dr. Rohlf/SF - Reiseplanung Forschungsschiffe

Fahrtteilnehmer

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Doggerbank Seefischerei GmbH, Bremerhaven

Deutscher Fischerei - Verband e. V., Hamburg

Leibniz-Institut für Meereswissenschaften IFM-GEOMAR

H. Cammann-Oehne, BSH

Objectives

1. Monitoring of the demersal fish fauna in the German EEZ
2. Distribution of temperature and salinity in the area of investigation

Narrative (Fig. 1)

FMS Solea left Cuxhaven on December 2nd at around 2:30 p.m. In the following two days the stations west and north of Helgoland could be worked on before a series of storms forced 6 days in Esbjerg and Cuxhaven. After returning to the investigation area the stations south and northeast of Helgoland could be processed for two more days. Afterwards, the shelters of Helgoland and Cuxhaven had to be called again for four days. After the storms had been abated, it was possible to process part of the remaining stations on three days with changing winds. The survey ended on the evening of December 19 in Cuxhaven before the next storm. The return trip to Bremerhaven took place the next day.

Results (Fig. 2 – 10)

A total of 40 15 minutes and valid hauls were made using the beam trawl. At all 40 stations salinity and temperature were measured.

The species composition distribution showed the usual geographic pattern with dab and sprat as the most frequent fish, followed by plaice, solenet and scaldfish. Cod was present only in very small amounts and quantities. More southern species such as anchovy were not represented. The catch of invertebrates consisted mainly of starfish, swimming crabs and whelks.

Participants:

Name	Institution
Kay Panten	TI-SF
Jana Bäger	TI-SF
Valeska Borges	TI-SF
Karin Krüger	TI-SF
Marie Rusch	TI-SF
Dimitri Schuschkow	TI-SF
Simon Wieser	TI-SF



Dipl.-Biol. K. Panten

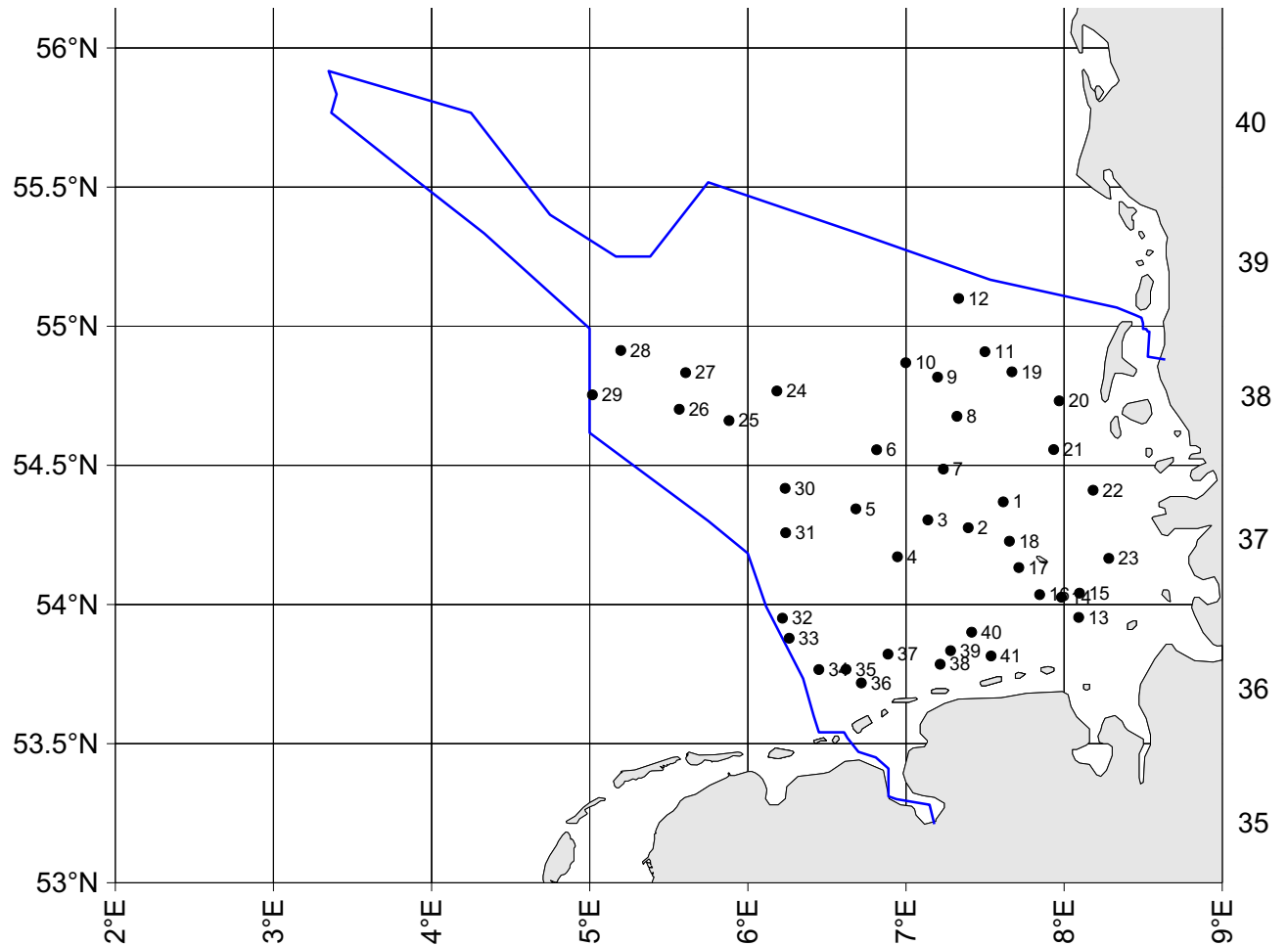


Fig. 1: "Solea", Cruise no. 771 , Haul positions and area of investigation

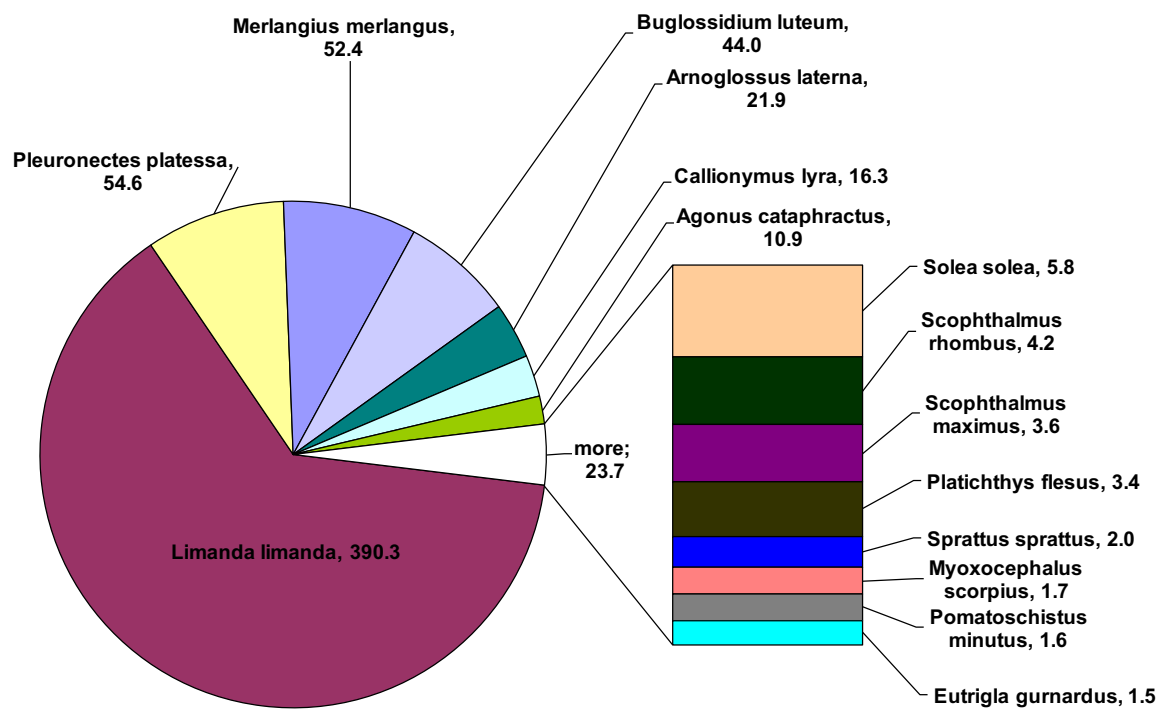


Fig. 2: Catch composition with the 15 most fish species caught in kg

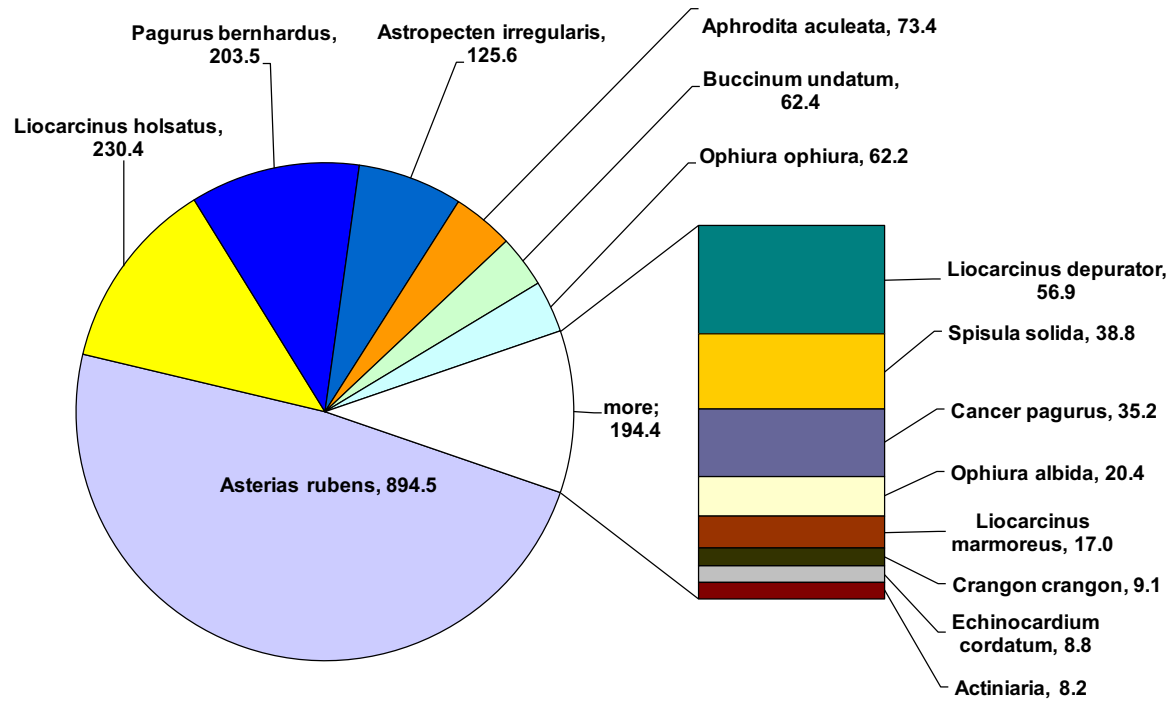


Fig. 3: Catch composition with the 15 most invertebrates caught in kg

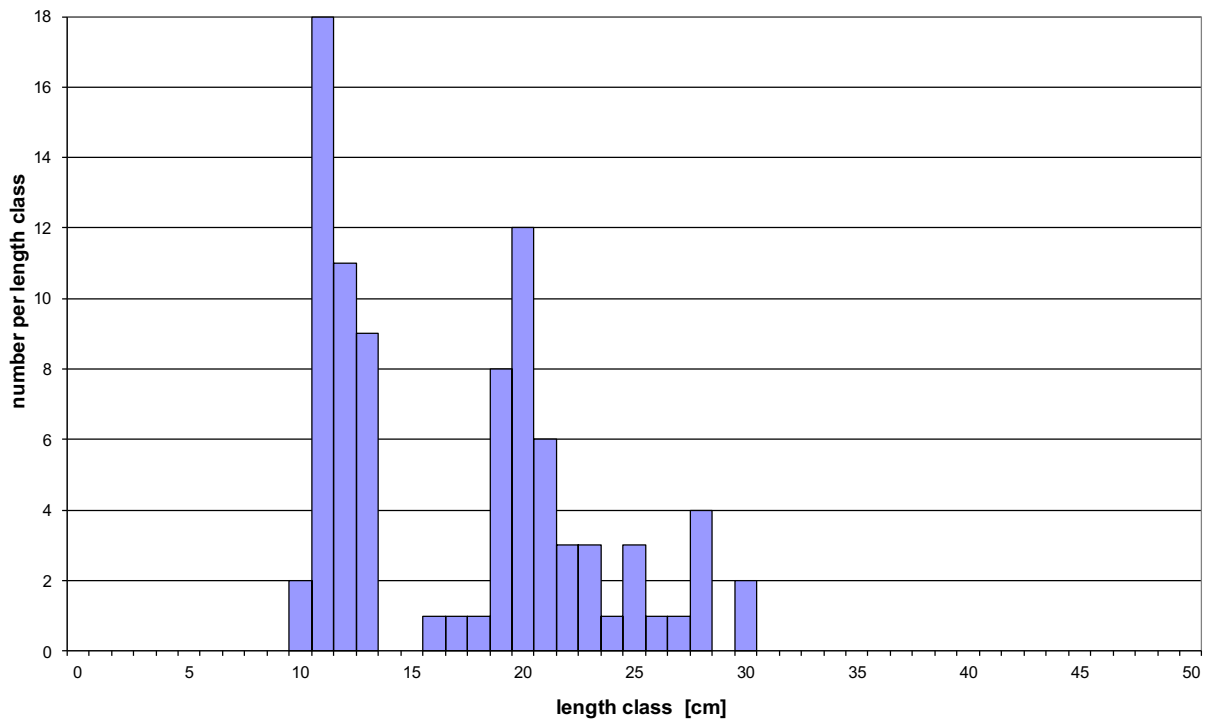


Fig. 4: Length distribution of sole (*Solea solea*)

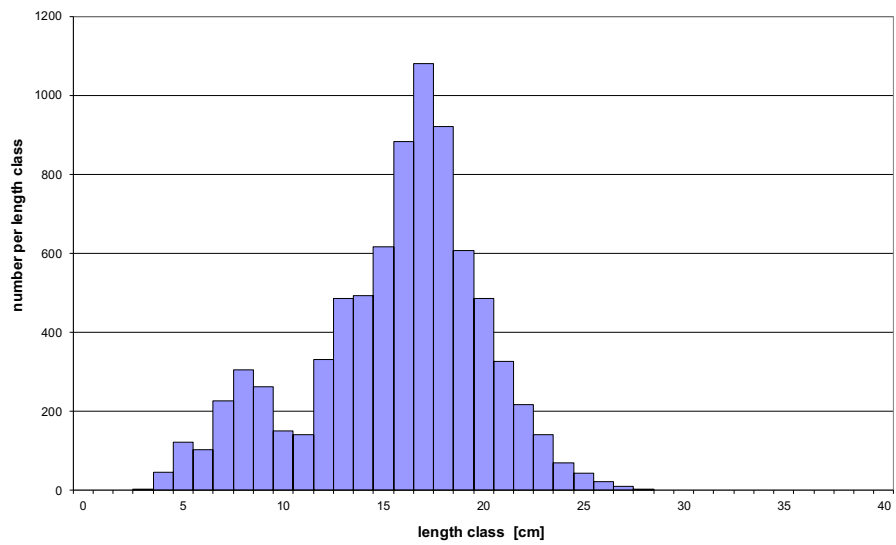


Fig. 5: Length distribution of dab (*Limanda limanda*)

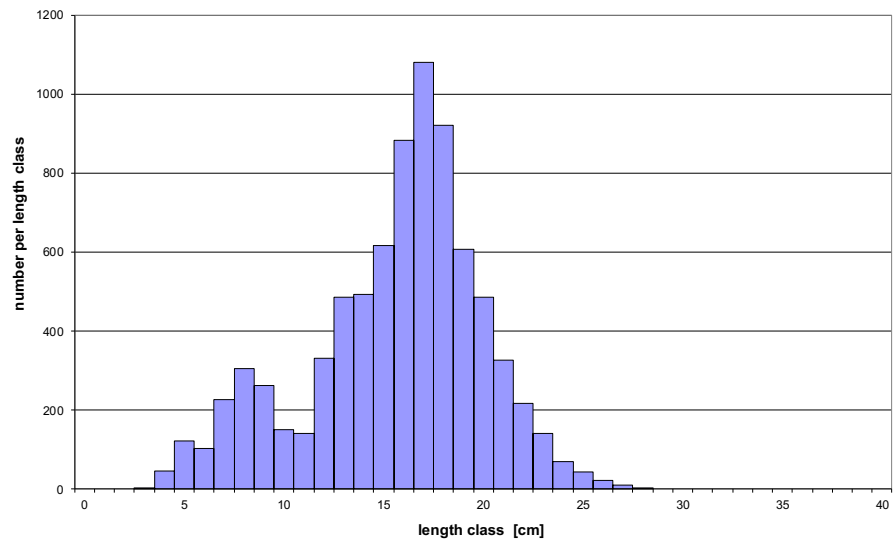


Fig. 6: Length distribution of plaice (*Pleuronectes platessa*)

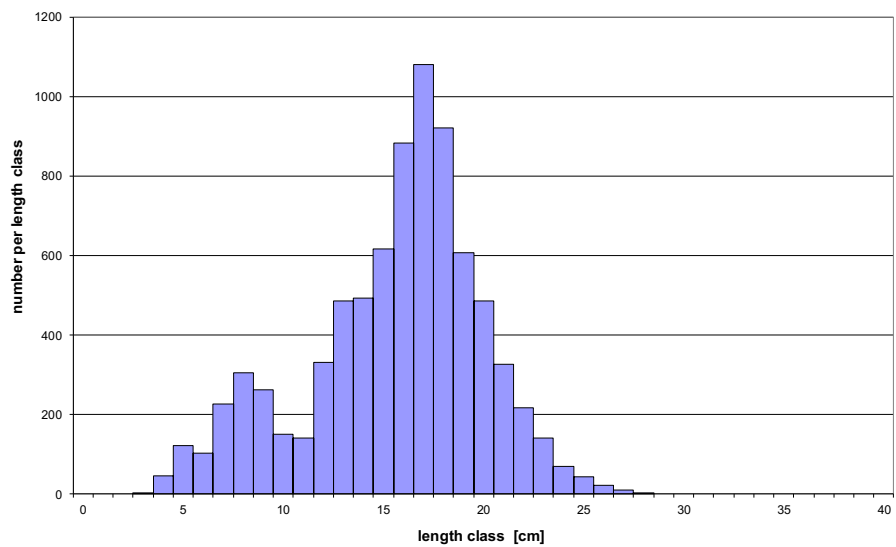


Fig. 7: Length distribution of whiting (*Merlangius merlangus*)

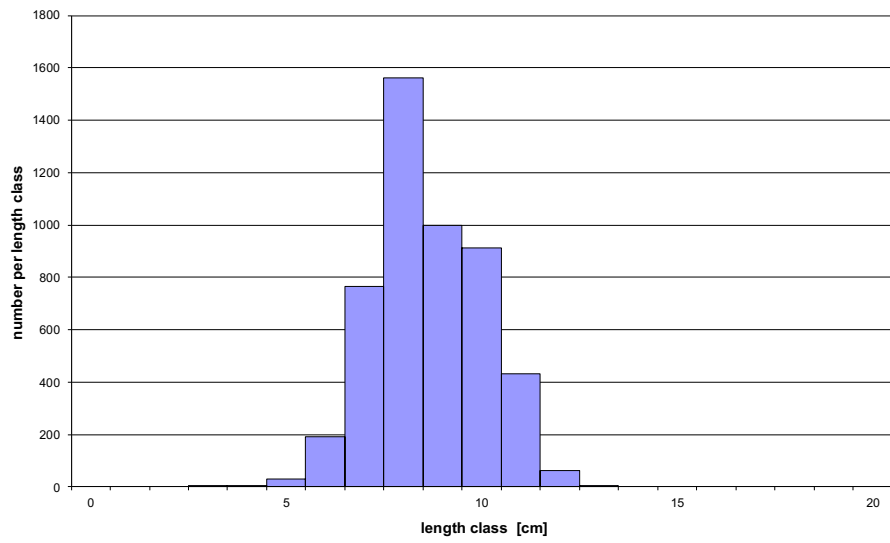


Fig. 8: Length distribution of solenet (*Buglossidium luteum*)

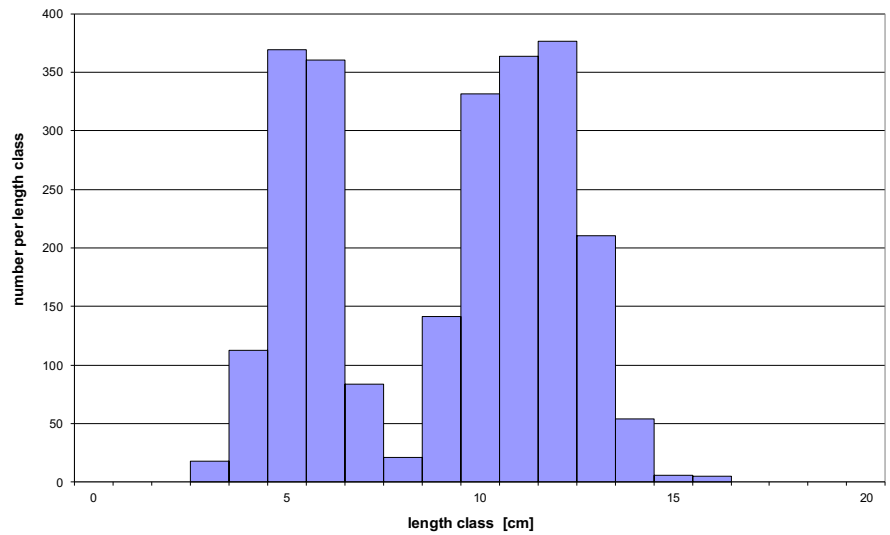


Fig. 9: Length distribution of scldfish (*Arnoglossus laterna*)

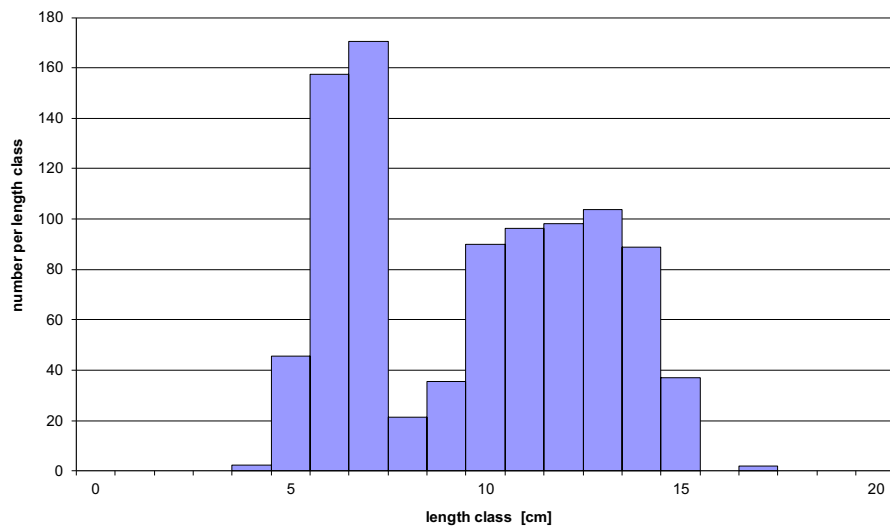


Fig. 10: Length distribution of hooknose (*Agonus cataphractus*)