Swedish Agency for Marine and Water Management

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

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

Swedish Annual Report for data collection in the fisheries and aquaculture sectors

2017-2019

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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.

BALTIC and NORTH SEA & EASTERN ARCTIC

1. Evidence of data quality assurance

Below a short description of the methodology used in the different major sampling types.

Surveys: All Swedish surveys listed in Table 1G are internationally coordinated and follow the established manuals and protocols and are conducted by experienced staff onboard. The data is recorded on paper protocols and thereafter registered in the database FD2 and checked. National quality checks in FD2 are performed (see details in Table 5A). Length-age/weight relationships are plotted to find outliers. Data is screened and checked through DATRAS before uploading.

Sea sampling: Sweden is applying probability sampling. Main fisheries in Sweden are sampled. A list of vessels are obtained from last year´s fishing pattern and a number of vessels are randomly selected from the list and the skippers are contacted by mail and are asked to contact the sampling coordinator at SLU Aqua in order to decide on the details for the trip to be sampled. In general, two trained observers are sorting the entire catch, register total weight by species and length measuring both landed part and the part that is discarded. Some species from the discarded part are sampled for age reading and individual length and weight.

The data is recorded on paper protocols for most sampling types and thereafter registered in the database FD2 and checked. Some fisheries are registered using electronic protocols. National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks on trip, haul, catch and individual level. For most data collected within sea sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, typical values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

Market: Sweden is applying probability sampling. From each vessel the first landing is sampled and one box from each size category is selected. From each size category, all fish are length measured, a specified number of individuals are sampled for age, length and weight. From sampled vessels a copy of the sales notes is collected, which make the match with the logbook easier at a later stage. National quality checks in FD2 are performed (see details in Table 5A). Script (based on COST) has been developed to do further quality checks. For most data collected within market sampling following are checked on a routine basis: consistency in codes, double records, missing information, date intervals match with number of days, realistic values for some parameters, gear codes/ métier, start and stop information, typical values for depth, sampling weight and total weights, length-age/weight relationships. Issues/problems in data are flagged in a summary report and outliers are plotted in box plots.

For salmon, only number (not biological data) of individuals are used in stock assessment. This data is collected from fishermen journals.

2. Deviations from the Work Plan

Independent of data source, number of individuals planned for sampling is based on a rounded two-year average (2014, 2015) in Table 1C.

Detailed short explanations for deviations are listed in “AR comment” in Table 1C.

General reasons for under- and over-sampling:

International survey manuals give guidelines on number of individuals / length class to be sampled for age, sex and maturity. These guidelines were followed and the actual sampled number is therefore dependent on the amount of catch, e.g. if only very few length classes are caught during the survey, the number of individuals sampled will end up being less than average and seems like it is under-sampled compared to planned numbers.

For some species, planned number of length measurements in sea sampling are incorrect, the very low numbers are unfortunately errors in table. Sampling for length has always been conducted for a large part of the catch, from which a smaller number of individuals have been sampled for biological parameters. The mistake comes from the interpretation of "length at age" where only number of length measured individuals collected for age was listed, and not number of individuals sampled for length.

3. Actions to avoid deviations

Systematic work to improve sampling design for all sampling types will generally improve sampling design and input data to assessment. No other action will be taken.

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

The National Swedish postal questionnaire

An annual postal questionnaire was sent to 11,000 randomly selected permanent residents in Sweden, covering ages between 16 to 80 years. The questionnaire was sent at three occasions during the year with questions regarding recreational fishing activities in the most recent four months. The statistics do not include fishing carried out by visitors to Sweden (i.e. recreational tourist fishermen). In this study, recreational fishing is defined as all fishing activities carried out by those without a commercial fishing license (excluding spearfishing).

Salmon

In recreational river catches survey, the salmon recreational fishermen fishing in Swedish salmon rivers are the target population.

Eel

Recreational fishery for eel is normally forbidden and eel fishing is since 2007 only allowed for commercial fishers with a special permit. However, upstream three insurmountable obstacles in rivers, eel fishing is allowed to fishers with normal fishing rights (land-, and water owners etc.) but they are not allowed to sell their catch. Potential IUU fisheries are hard to disclose and assess. The responsible agency, the Swedish Agency for Marine and Water Management, estimates the extent of the legal recreational fishery for eel to be of minor importance. The target population is largely unknown as there are no legitimate claims for them to report to any agency.

2. Type of survey

In Table 1D, the methodology or type of survey used must be included, but any information about the design is missing.

Table 5A in the Work Plan allows to identify if the sampling design is documented and where it can be found. Are the surveys identified correctly in table 5A and information about sampling design provided under this table? **YES** (fully for the National Swedish postal questionnaire)

Salmon

Estimates of total trolling catch in offshore areas are based on surveys carried out in the Main Basin (SD 25–29) about every other year. Total nominal catch in the recreational trapnet fishery is estimated by comparing number of recreational gears to catches in the commercial trapnet fishery. An inventory of recreational trapnets distributed along the Swedish coast (SD 29–31) is carried out every fourth year.

River catches are yearly collected from all Swedish salmon rivers through questionnaires and river “census” data. This census data is gathered in collaboration with county administration boards and local fisheries organizations, which collect catch data from "all" recreational fishermen in the rivers.

However, the methodology for collecting catch statistics differs between and within rivers due to e.g. differences in size of the rivers, the organization of the fishery and the number of fishing tourist, and include e.g. questionnaires, web site reports and requests to local contact persons. The catch data from each contact person have in turn been collected in a variety of ways (e.g. “mandatory” catch reporting systems, voluntary catch reporting systems, estimates). Data quality highly depends on local interest, size of the river and on how the river fishery is organized.

Eel

Not applicable.

3. Data Quality

Information about non-responses and refusals is found in the Work Plan, Table 5A. Are non-responses and refusals recorded in table 5A? **YES** (fully for the National Swedish postal questionnaire)

General comment: Non-responses and refusals are recorded for the postal questionnaire but not for the river catches as this survey largely differs between and within rivers and depends on voluntary participation as no obligations to report recreational catch exist due to Swedish legislation.

4. Data Analysis and processing

Information about data processing is found in the Work Plan, Table 5A. Are the editing and imputation methods documented and identified? **YES** (fully for the National Swedish postal questionnaire)

Does the estimation procedure follow the survey design? **YES** (fully for the National Swedish postal questionnaire)

Has the precision of the estimates been calculated and documented? **YES** (fully for the National Swedish postal questionnaire)

Salmon

The editing and imputation methods are currently not documented for Recreational river catches survey, but work is in progress within the SLU quality guide program.

The estimation of recreational fishery follows the survey design that WGBAST and WGNAS has approved.

WGBAST and WGNAS evaluate precision of the estimates and uncertainty about catch estimates are included in the models. Recreational fishery takes place in offshore areas by trolling (not sampled 2017), in coastal areas by trapnets (not sampled 2017) and in rivers by rod angling as well as use of nets, seine nets and other gears (sampled 2017).

Eel

Not applicable.

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.

BALTIC SEA

Recreational fishing data sampling –a pilot on the combination of biological data collection and postal questionnaire to support an ecosystem-based management.

1. Aim of pilot study

Pilot study in ICES area 23 and 24 on catches, effort and socio-economy of recreational fisheries in an ecosystem-based management with focus on cod management.

The aim of the study is to primarily to collect size-based catch (including released fish) and effort information on cod and give knowledge for an ecosystem-based approach on fisheries management principles of good governance accordingly to best available advice and broad stakeholder involvement. Information on by-catch species and information on the demography of fishermen are also collected as a complement.

2. Duration of pilot study

The pilot study will start 2017 and run for one year.

3. Methodology and expected outcomes of pilot study

The pilot study of on-site sampling of catches will be an extension of a yearly postal questionnaire sent to approximately 10,000 randomly selected permanent residents in Sweden. The on-site study on recreational fisheries in ICES area 23 and 24 will enhance the resolution of the questionnaire particularly concerning length composition, catch and catch areas. Normally on-site data sampling is used to validate off-site data sampling but also vice versa. Questionnaires are often used for supporting on-site sampling especially with total effort and socio-economic-related parameters.

A. The postal questionnaire

A postal questionnaire will be sent to approximately 10,000 randomly selected permanent residents in Sweden, age 18-80 years. The questionnaire will be sent at three occasions during the year with questions regarding fishing activities in the most recent four months. The statistics do not include fishing carried out by visitors to Sweden. In this study, recreational fishery is defined as all fishing activities carried out by those without a commercial fishing license. At sea, this includes fishing activities surrounding recreation, tourism and sports.

The questionnaire will give information on the recreational effort, gear use and expenditures.

B. The on-site survey

The on-site survey attempts to collect data from recreational fishermen carried out from the shore, private boats and Swedish commercial fishing-tourism vessels in SD 23-24. The study will include both Swedish residents and recreational fisheries carried out by visitors to Sweden. The on-site survey will beside of information about persons practicing recreational fisheries give information on effort, used gears and expenditures and biological data on individual fish kept (weight, length etc.) and released (numbers and species) necessary for the application in stock assessment.

Sampling will cover:

- Stratification: by area (23 and 24), quarter and day type (weekend, weekday)
- Tourist boats
- Charter boats
- Private boats
- Shoreline anglers

<u>Outputs</u>

The results of the different components will be evaluated quarterly and methodology and sampling effort adjusted if necessary; Preliminary results will be presented and discussed at WGRFS; In Q1-2018 estimates of the different components will be produced for presentation in 2018 WGBFAS.

<u>Background</u>

Swedish legislation allows residents to fish with hooks but also with a limited amount of nets and pots. Preliminary literature and field work has indicated four main components in the recreational cod fishery: the tourist boats, the charters, the private boats and shoreline anglers. Jointly, tourist boats and charters constitute the fore-hire sector and develop an essentially for-profit activity. Private boats and shoreline fisheries are likely much more numerous and constitute the non-profit sector.

To meet the challenge of quantifying catches of Western Baltic cod stock for assessment and management purposes, the on-site study will adopt a phased approach in the implementation of data collection for the previously mentioned components. It will start with components where some information is already available, namely a list of companies carrying out the activity (the tourist boats and boats). As a knowledge base is built and first estimates are obtained, the methodology and sampling effort will be adjusted, if possible, to progressively incorporate the sampling of the more complex components (private and shoreline) where, at-present, less information exists to inform the design of the sampling plan. The on-site study will be based on voluntary participation of anglers and its execution is entirely dependent on the cooperation of this sector. Consequently, all throughout validation studies will be carried out and the level of response rates and refusals will be monitored, and, if necessary, methodology revised.

BALTIC SEA AND NORTH SEA AND EASTERN ARCTIC

Pilot study eel in freshwater and coastal water

1. Aim of pilot study

In 2017, the aim is to collect information, plan, and design a pilot study to evaluate the relative share of catches of recreational fisheries compared to commercial fisheries of Eel in freshwater and in coastal waters, ICES IIIa and Baltic (SD 22-31).

2. Duration of pilot study

Two years.

3. Methodology and expected outcomes of pilot study

Year one: Data inventory and compilation. Development of sampling design and planning.

Year two: Execution of data collection from recreational fisheries (likely through questionnaire) and data analysis.

Expected outcome: The expected outcome from 2017 is a well-planned sampling design to fulfil the aim with an acceptable level of certainty. After two years the pilot study will present an assessment of the relative share of catches of recreational fisheries compared to commercial fisheries of Eel in freshwater and in coastal waters, ICES IIIa and Baltic (SD 22-31).

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

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

Both Postal Questionnaires **(A)** and on-site survey **(B)** were carried out according to plan.

With regards to Postal Questionnaires **(A)** 11,000, in total, national postal questionnaires were sent out tertially (N 2600; 5800; 2600) during 2017 and expected outcome of the sampling scheme was fully achived for all of the three data collection periods. To gain better estimates in general and to support for scientific advice in particular, Swedens national postal questionnaire have been modified for 2018´s survey regarding data gaps and spatial resolutions for better harmonisation to e.g. on-site surveys (B). Following adjustements, originating from discussions between SLU Aqua, SwAM and Statistics Sweden during 2017, have been made and will be fully operational in 2018:

- In previous years, 2013-2017, data on gear specific catch and release frequencies have been collected. For 2018 the survey will focus on species specific catch and release frequencies instead of gear specific. This change will provide us with valuable information regarding catch and release data on both gear and species level, to better understand the behavior of practising catch and release.
- The spatial resolution in the 2017 (and previous) national postal questionnaire have been an issue especially for this pilot study since it have been noticed that respondent data originated from Southern Baltic Sea have not been fully operational due to the geographical deviation from ICES SD 24 and SD25. However, from year 2018 we have manage to separate catches via new mapping structure so that we can now collate data from SD 23, 24 and 25 separately.

Brief description of recreational cod fishing in SD23, 24 and 25:

There are approximately 45,000 Swedish fishers for recreational purposes fishing for Cod in the Sound and Southern Baltic Sea combined. Together these fishers spend approximately 150,000 fishing days and the majority of the fishing days are spent on a (private) boat, fishing with traditional rod and reel. Furthermore, tour boats operate in the area and shore angling is also popular. It also exist some fishing for Cod with passive gears, such as gill nets. The majority of the fishers reside in the near region (Skåne and Blekinge). There are tourist fishers targeting Cod in the region as well, which reside in adjacent regions, Halland, Kronoberg and Kalmar.

Due to the survey design and a relatively low sample size, the estimates have a high standard devation resulting in a large confidence interval. However, the information is still valuable as it identifies fishing pattern, with temporal and spatial resolution.

With regards to **(B)** over 535 marina visits (over 2500 hours of field work) were carried out during 2017. Sampling of marinas during 2017 Q1-Q4 was performed for all planned sampling events. Marinas in SD23 were sampled 12, 12, 24, 24 times for Q1-Q4 respectively. Marinas in SD24 were sampled 6, 6, 6, 6 times for Q1-Q4 respectively. Tourboats in SD23 were sampled 5,6,5,5 times for Q1-Q4 respectively. The missing samples were due to non-responses from Tourboats.

Data collected from the sampling did not deviate from the plan. However, some adjustments to the design and implementation were made:

- The stratification originally suggested included type of day (weekends and weekdays). However, during design stage it was realized that would lead to overstratification. Upon consultation of two external experts systematic sampling across days of the week was adopted which also provides proportional coverage accross day types. Also charter boats in SD23 were a minor segment and were incorporated into the on board sampling and logbook stratum together with tour boats.
- Shoreline anglers were interviewed at marinas to sample information on fishing habits (times, sites) and associated catches and releases. This information will provide inside into the need to continue monitoring this component with regards to cod catches in upcoming years.
- No sampling was carried out on tourboats of SD24. Only two tourboats targeting cod operate SD24 with a very minor total effort. Some activity can be expected by a charter fleet of smaller boats being

transported there by trailers, but those vessels target salmon and thus have a very minor contribution to cod catches.

- The on site interviews in the marina sampling did not pose questions on expenditures. Interviews were needed to be kept short. A swift person to person meeting was not a suitable environment for asking questions about personal economy and was thus not included in questionnaire.

Methods were presented at WGRFS and World Rec Fish Conference. A 1st set of point estimates on effort and catch of private boats were carried out in September/2017 and presented at a WK on RecCod fisheries in Copenhagen on October/2017 receiving comments from experts. Estimates on tourboats are also available. Tourboat sampling yielded the expected results and a significant number of biological samples. However the number of biological samples collected from private boats were lower than expected. To account for this at end of Q2, the private boat programme was adjusted and increased sampling effort allocated to Q3 and Q4 in SD23. In 2018 further data is being collected and the point estimates of catch and effort are being reviewed to allow for full conclusion on the validity of the methods applied to private boats. There is a need to strike a correct balance between costs, precision and number of biological samples and difficulties in achieving this are leading to the test of new methods for effort determination (RDS and Cameras) that would allow marina sampling to target biological samples more directly.

5. Incorporation of results from pilot study into regular sampling by the Member State

The sampling of recreational fisheries is a distinct programme from the sampling of commercial fisheries, involving different data collection methodologies and statistical analyses. Results from 2017 were promising but preliminary and a set of new methodologies will be tested to meet their limitation. It was considered that the pilot study was not yet at a stage to be incorporated in the regular sampling and that the pilot programme should continue in 2018. Among other, adjustments to the 2017 current sampling plan and new methodologies aiming will improve accuracy and possibly allow the monitoring of SD25 and SD27 are being tested.

Regarding the national postal questionnaire, some modifications have been implemented into the survey to be more harmonized with the on-site studies as well as for scientific advice and managemental perspective.

Fishing for eel in general is forbidden, with an exception to professional fishers with a special permit. Thus, recreational fishing is no longer possible, at least not on legal grounds. Even though eel fishing upstream three unsurmountable dams in freshwater is still possible to fishing right owners (for personal use only) that type of recreational fishery is considered as negligible. The planned pilot study for eel in fresh water and coastal water was for that reason not implemented.

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.

1. Method selected for collecting data.

Salmon

Data collection for salmon consists of annual electrofishing surveys of juveniles (parr), trapping out-migrating smolts and counting ascending spawners in fish ladders in designated rivers. Electrofishing is also undertaken in additional rivers, where these data comprise the main source of information for stock assessment. Fish ladders are also installed in some rivers, and data are collected from some of these annually (Table 1E). Designated rivers are spread among assessment units to comply with end-user (ICES) needs. Estimates of smolt and parr abundance are made through mark-recapture experiments and repeated sampling, by traps and electrofishing, respectively. For smolts, individual length and weight are collected for all individuals, and scale samples are taken from sub-samples stratified by time of capture for age determination. The number of electrofishing sites per river varies with size/length of river to cover areas of salmon reproduction. The suggested number of sites fulfills the minimum requirement for an acceptable level of certainty for each river, with respect to smolt production estimates used for stock assessment. For salmon, data from commercial and recreational fisheries in freshwater are collected from fishing log-books and questionnaires, respectively.

Eel

Recruitment of young eels into freshwater is estimated and sampled by electrofishing and by eel counters in a number of rivers. Significant numbers of recruits are artificially stocked as young eels. Introduced yellow eel populations are monitored and sampled using either fyke nets or outlet traps. Silver eels are sampled from selected commercial fishery in three lakes. The fishing mortality and escapement of migrating silver eels is estimated annually through mark-recapture studies at three different and altered sites along the Baltic coast. The recreational fishery is planned to be estimated using a pilot study, starting in 2017. The conditions for one or two designated rivers will be evaluated in 2017.

2. Were the planned number achieved?

Salmon

Due to high water levels and strong currents in some rivers some electrofishing sites could not be fished in 2017. In some rivers, additional sites than planed were fished to improve statistical power of data collected (due to low parr densities). The fishcounter in Mörrumsån had some technical problems and therefore the data was considered unreliable and were not used in the assessment 2018. The counter will be serviced during 2018. High water flow also made operating smolt traps more difficult and the number of smolt that was sampled for age was reduced in some rivers to mitigate handling stress.

River	method	% of achievement	Explanation	Justification
Mörrumsån	electrofishing	47	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Ume/Vindelälven	electrofishing	47	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Råneälven	electrofishing	36	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Åbyälven	electrofishing	88	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Kågeälven	electrofishing	54	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Emån	electrofishing	70	Insufficient achieved number of electrofishing sites was reported due to high water levels and strong currents.levels and strong currents.	Electrofishing by wading is not possible at too high water levels or at too strong currents.
Mörrumsån	Trap	84	In river Mörrumsån low smolt numbers in combination with high water temperatures prevented reaching the desired 150 individuals for age readings.	Age sampling was reduced to mitigate handling stress (of individual fish). At high water temperature fish were not sampled to maintain ethical handling.
Ume/Vindelälven	Trap	66	High water flow due to large runoff from snow thawing led to less individuals sampled	Age sampling was reduced to mitigate handling stress (of individual fish) as high water flow makes operating smolt traps more difficult.

Eel

The conditions for one or two designated rivers are now investigated and we plan to launch one of them during 2018.

Planned numbers was achieved, as there were no major deviations. However, the low % of achievement in IIIb-d was due to that the catches of eel were lower than expected. In two out of the three areas sampled in IIId the catches of eel were lower than expected, thus the low % of achievement even though planned maximum effort was carried out.

The initial steps towards the installation of one to two designated rivers were taken, so also that part of our plans was fulfilled.

Baltic Sea and North sea and Eastern Arctic, yellow eel, coastal sites.

A survey is conducted yearly in August in order to continue following the eel stock in this area. The commercial fishery was indirectly closed due to that the minimum landing size was increased, hence it is no longer possible to continue the commercial sampling. The survey set-up include catching a predefined number of yellow eels, all of which are length measured. Using length-stratification, a sub-sample from the total catch of yellow eel is then collected for biological (age) sampling. Silver eels caught are also measured for length and in 2017 also aged. In the survey manual, the maximum effort (gear-days) to be aiming for is defined. No other species than eel are sampled.

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.
No regular sampling is undertaken for incidental by-catch of birds, mammals, reptiles and fish and therefore nothing is reported under this section. See text in Pilot Study 2.

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.
BALTIC SEA **1. Aim of pilot study** The aim of the pilot study is to assess if it is possible and efficent to estimate by-catches, of primarely birds and mammals, in the gillnet and longline fisheries in southern and central Baltic Sea with sea-going observers. **2. Duration of pilot study** The pilot study will be carried out during 2017. **3. Methodology and expected outcomes of pilot study** Sweden have during previous years been running a self-sampling programme for gillnetters and longliners in the Baltic. Within this programme fishermen bring entire catches to shore where it is worked up by samplers. The plan is that during 2017, for the purpose of this pilot study, put the samplers on-board the entire fishing trip instead (see table 4A and 4B). If this is not possible for specific vessels due to lack of space sampling will be carried out on shore instead as previous years. The observers will measure fish as well as potential by-catches of birds and mammals. If possible will cameras be deployed at some vessels in some areas and during some study seasons. Results from theses vessels will be compared to corresponding vessels carrying observers, for evaluation of the cost-effectiveness of the different methods.

The present scheme for sampling passive gears will be redisgned to take into account high-risk areas and seasons for by-catches birds and harbour porpoises.

We intend to investigate:

a) if it is possible to put observers on sufficent amount of vessels (majority of vessels are small) to generate accurate data;

b) the occurrence and patchiness of by-catch. Is it efficient to collect this type of data with observer schemes? If so, how shall the schemes be designed and what kind of sampling intensity is needed;

c) if it is possible to have efficent multi purpose oberver schemes (eg. fish and by-catches);

d) what is the cost-effective way to obtain data on by-catches of birds and harbour porpoises.

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

During 2017, 55 trips of gillnetters and longliners were sampled in the southern and central Baltic (SD 23, 24 and 25). The vessels are small, usually smaller than 10 m. We were able to carry through 33 of those trips with observers on board. The rest of the trips were self-sampled. The proportion of trips that could be conducted with observers onboard were higher than expected, indicating that observer schemes can be deployed even for this fleet. The cooporation with the fishermen was working very well. No by-catch of birds or mammals were reported from the selfsampled trips while such by-catch were reported in five out of the 33 trips with observers.

The sampled trips are too few to draw clear conclusions on potential future sampling designs and sampling intensities. There were however some initial observations that are used as a basis for a pilot in 2018. Two important such observations were that:

All by-catches of birds were observed at gillnets deployed at less than 15 metres depth.

More by-catches were observed in SD 23 than in the other sudivisions.

Multi purpose sampling

The objectives of a multi sampling programme of this fleet would in theory be a) discard estimates of cod, b) discards of other species, c) biological sampling of cod and d) sampling of by-catch. It was possible to have efficent multi purpose sampling on the vessels from a practical perspective as the vessels are small (observers can observe the hauling while conducting other duties). As the cod fishery usually takes place at larger depths than 15 meters it might however be difficult to combine all the above listed objectives to be effectivly sampled during the same fishingtrips. More data are however needed before this conclusion can be drawn.

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

By-catch was highest in subdivision 23. Sampling of by-catch in this subdivision will continue in 2018 in the same way (with observers) as for 2017 and will eventually be included in the regular sampling programme. Sampling in subdivision 24 and 25 will return to a self-sampling programme as encounters with by-catch were very low. The observer effort from these subdivisions will instead be used in a continuation of the by-catch pilot in 2018. The area and fisheries that will be targeted are gillnet fisheries in subdivison 27 (incl part of 28) where fisheries sometimes target flatfishes and are carried out at more shallow depths.

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 reseach 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.

BALTIC SEA

BITS Q1 and BITS Q4 – Baltic International Trawl Survey

1. Objectives of the survey

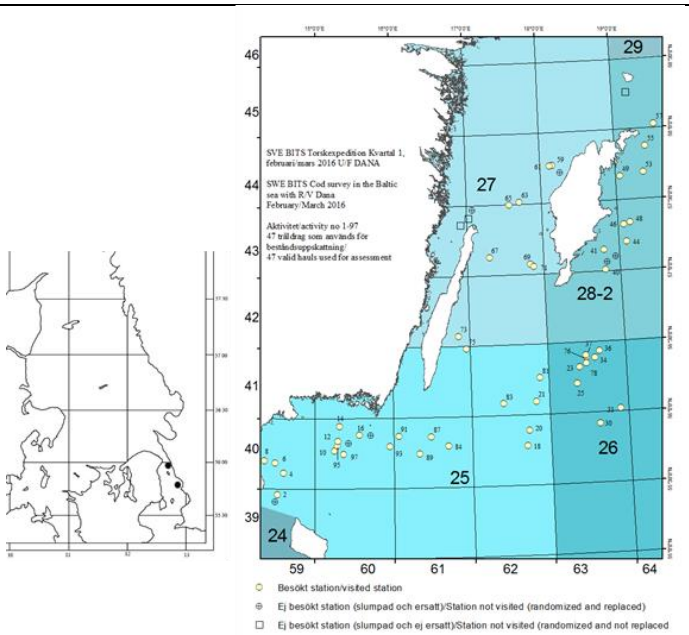
To estimate cod recruitment indices, cod abundance and to follow the development of flounder and other flatfish populations in the different Sub-Divisions in the Baltic.

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

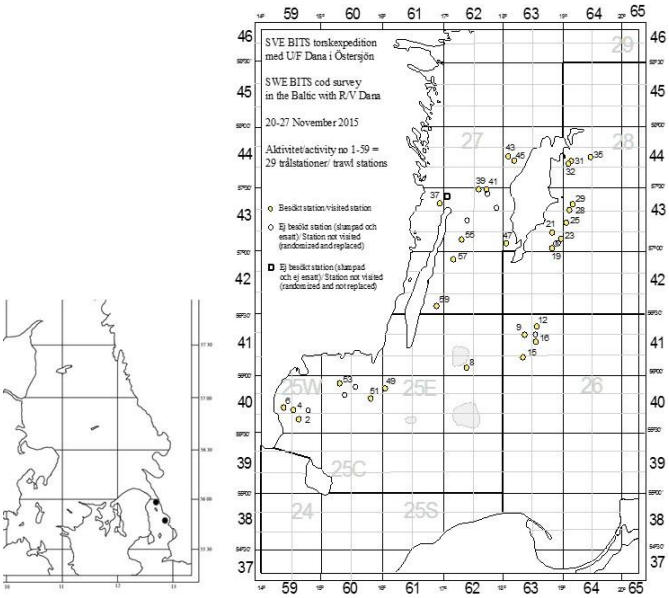
The survey is conducted using a TV3L demersal trawl at day-time. Sweden is assigned 50 randomly selected hauls for the first quarter survey and 30 randomly selected hauls for the fourth quarter survey. For both surveys hydrographical data are collected with a CTD in connection to the trawl hauls and acoustic data were continuously recorded. Each haul are sorted and all species are recorded, length measured and weighted. For target species biological parameters are collected on fish length, age, weight, sex and gonadal maturity. In case of large catches subsampling is performed. Additional sampling like stomach content on cod and flounder is undertaken and from each haul marine litter are registered. The data on marine litter is uploaded to the international ICES database.

Further details are explained in the Baltic International Trawl Survey (BITS) manual:
http://ices.dk/sites/pub/Publication%20Reports/ICES%20Survey%20Protocols%20(SISP)/2017/SISP7%20BITS%202017.pdf

In the Sound, two stations with one to two hauls in each station (depending on the size of the catch) is trawled by a small Swedish vessel Hålabben using a down scaled TV3 930 trawl, to 30 % of original size. Except from the small trawl, the biological sampling is following the procedure described above.



Map 1. BITS first quarter survey in 2016. Trawl stations conducted by R/V DANA is shown in the map to the right and two trawl stations (three hauls) conducted by Hålabben to the left



Map 2. BITS fourth quarter survey in 2015. Trawl stations conducted by R/V DANA is shown in the map to the right and two trawl stations (three hauls) conducted by Hålabben to the left.

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

The Danish R/V DANA are chartered for the surveys in the Baltic and is complemented with R/V Hålabben in the Sound (SD23). Participating Member states in the surveys are: Denmark, Germany, Latvia, Poland, Lithuania and Sweden. The BITS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) and the data are uploaded to the international ICES database DATRAS.

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

Since 2011, Sweden has used the Danish vessel R/V DANA in the BITS surveys and a cooperation agreement between Sweden and Denmark has been established were all the practical details (price, payment, staff etc) for smooth cooperation are described. Latest agreement signed is valid until 31 Dec 2017.

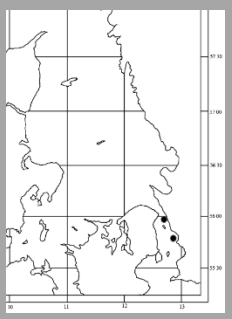
5. Explain where thresholds apply

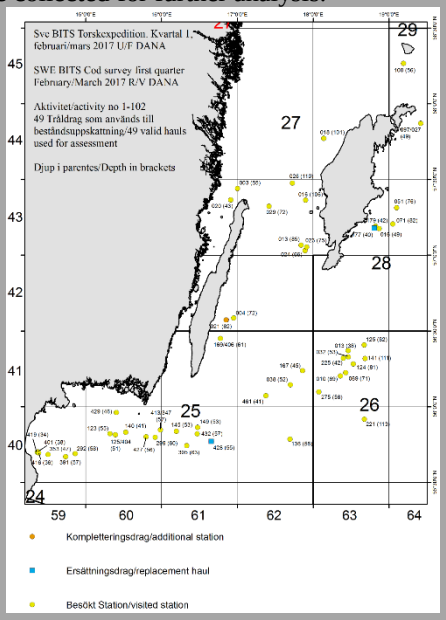
No threshold applies to the BITS surveys

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

BITS first quarter: Overall, 25 fish species were caught. A total of 45.6 tonnes of fish were caught, which consisted of 2.1 tonnes cod (8 200 individuals), 23.5 tonnes herring and 18 tonnes sprat. Otoliths were collected for age determination with the aim to sample one individual per cm-class and haul. Overall, 870 individuals of cod were collected and age-estimated.

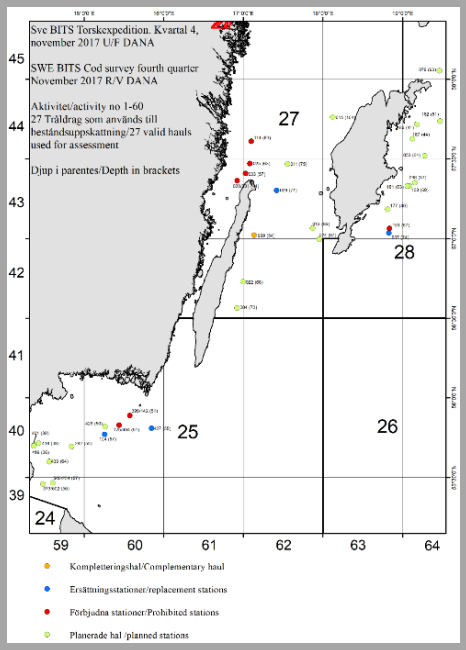
For flounder, otoliths were collected with the aim to sample 20 individuals per cm-class and SD. Totally, 1 079 flounder otoliths were sampled. The other fish species were measured, weighted and the total catch was recorded. For cod and flounder stomachs were collected for further analysis.

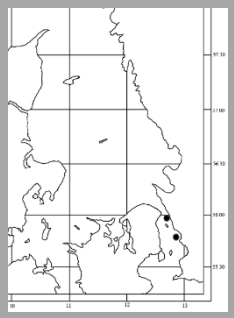




Map 1. BITS first quarter survey in 2017. Trawl stations conducted by R/V DANA is shown in the map to the right. The two stations conducted by Hålabben in the Sound is illustrated in the map to the left.

BITS fourth quarter: Overall 23 species were caught. A total of ~18 tonnes of fish were caught of which 1.5 tonnes of cod (6 656 individuals), ~12 tonnes of herring and ~3 tonnes of sprat. Otoliths were collected for age determination with the aim to sample one individual per cm class and haul. Overall 355 individuals of cod were age determined. For flounder, otoliths were collected with the aim to sample three individuals per cm class and haul. Totally 601 flounder otoliths were sampled. The other fish species were measured for length and weight and total catch was recorded.





Map 2. BITS fourth quarter survey in 2017. Trawl stations conducted by R/V DANA is shown in the map to the right. The map to the left the two trawl stations (three hauls) conducted by Hålabben are illustrated.

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

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/WGBIFS/WGBIFS%202017.pdf

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

Abundance estimates WGBFAS, Data compilation WS, benchmark WS.
Marine litter is uploaded to DATRAS and used for estimation of one of the indicators in MSFD.
The information of stomach content is used in several projects and ICES groups, e.g. WGIAB, WGCOMEDA.

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

No extended comments to be explained.

BIAS – Baltic International Acoustic Survey

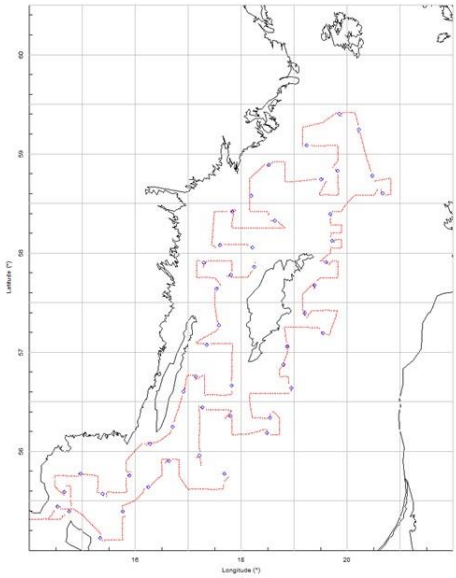
1. **Objectives of the survey**

The aim of the survey is to provide abundance estimates of herring, sprat and pelagic cod in the Baltic Sea.

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

The survey is using a SIMRAD EK607 echo sounder with the 38kHz transducer (ES38b) mounted on a towed body for the acoustic transect data collection and a pelagic trawl, Fotö trawl for collecting biological information. Approximately, 2 hauls are made in each ICES rectangle. For each haul, all species are length measured onboard and parameters such as age, weight, and sex are analyzed on herring and sprat and cod, the gonadal maturity is also analysed on herring. Sweden is responsible to cover area subdivision (SD) 27 and parts of SD 25, 26, 28 and 29. The acoustic data together with the biological information is used in the assessment models. Additional sampling on stomach content on cod is undertaken.

The Manual is available at http://www.ices.dk/community/groups/Pages/WGBIFS.aspx



Map 3. Survey grid and trawl positions of R/V Dana during BIAS survey 2015.

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

The BIAS survey is coordinated by the ICES Baltic International Fish Survey Working Group (WGBIFS) and the data are uploaded to the international data storage, IBAS database. Participating countries in the survey are Estonia, Finland, Germany, Latvia, Lithuania, Poland and Sweden.

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

Since 2011, Sweden has used the Danish vessel R/V DANA in the BIAS survey and a cooperation agreement between Sweden and Denmark has been established were all the practical details (price, payment, staff etc) for smooth cooperation are described. Latest agreement signed is valid until 31 Dec 2017.

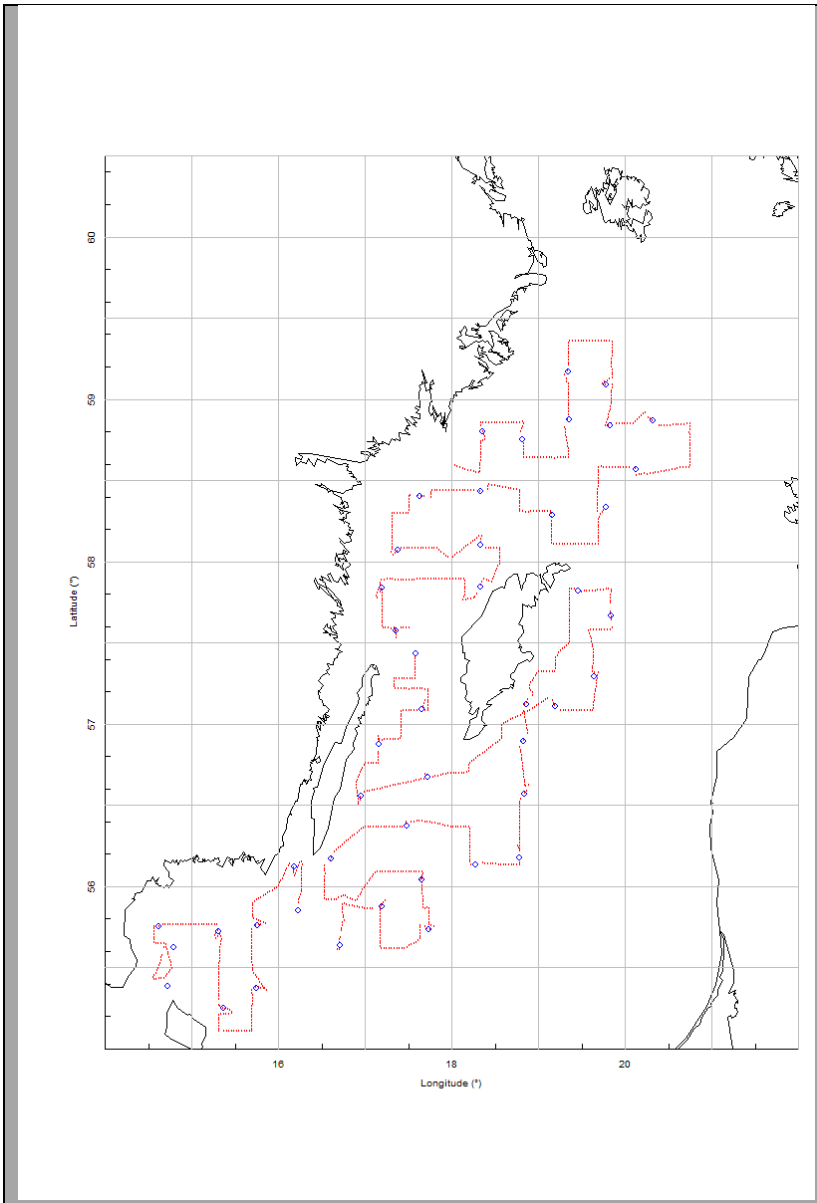
Sweden has also an agreement with Finland regarding the parts run by Finland in SD 30. Sweden is sending two staff for participation during the survey.

5. Explain where thresholds apply

No threshold applies to the BIAS survey.

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

Member State shall provide maps presenting the spatial distribution of the main sampling types obtained during the survey.



Map 3. Survey grid and trawl positions of R/V Dana during BIAS survey 2017.

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

The latest meeting report can be found following this link.

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

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

The main objective of BIAS is to assess herring and sprat resources in the Baltic Sea, and produce indices. The survey will provide data to the ICES Baltic Fisheries Assessment Working Group (WGBFAS). Data compilation WS, benchmark WS.
Additionally, the data is used in a number of scientific publications and has been used for producing a LF Indicator trough HELCOM. The information of stomach content is used in several projects and ICES groups, e.g. WGIAB, WGCOMEDA.

9. **Extended comments (Tables 1G and 1H)**
Not applicable for this survey.

NORTH SEA AND EASTERN ARCTIC

IBTS Q1 AND Q3 – THE INTERNATIONAL BOTTOM TRAWL SURVEY

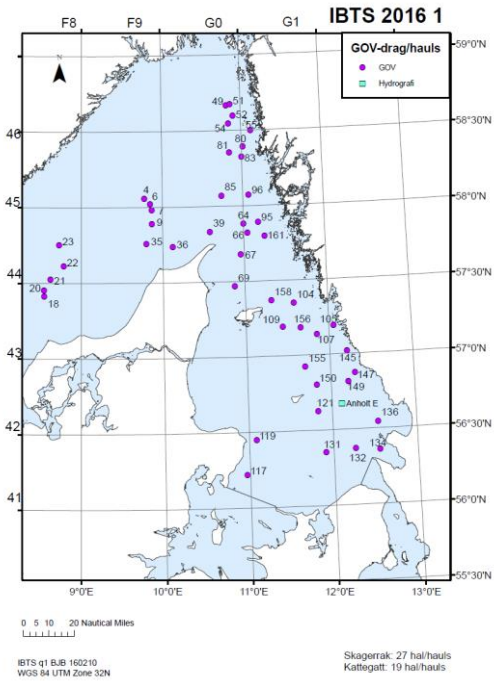
1. Objectives of the survey

The main aim of the survey is to estimate abundance of recruitment of the target species cod, haddock, whiting, Norway pout, herring, sprat, saithe, plaice, mackerel and also non-commercial fish. Moreover, the otoliths of the commercial species are collected and subsequently analysed in order to assess abundance by age class, in particular for the recruiting year classes in the Skagerrak and Kattegat.

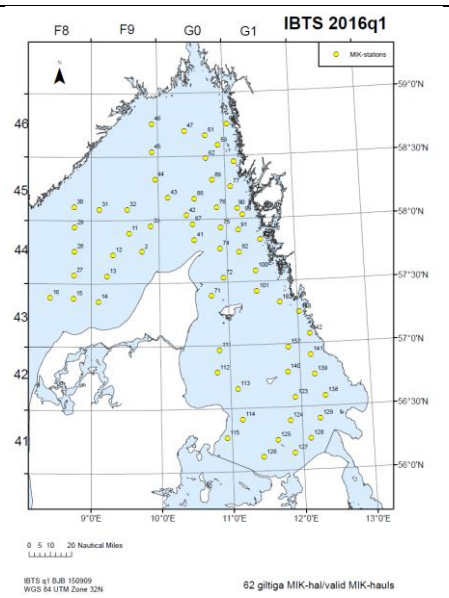
2. Description of the methods used in the survey. For mandatory surveys, link to the manuals. Include a graphical representation (map)

This survey is conducted twice annually, in quarters 1 and 3. The French bottom trawl GOV is used for sampling demersal species in both quarters while in Q1 only, a MIK (Midwater ring net) trawl is used at night for sampling fish larvae. Sweden is assigned 46 hauls for the first quarter survey and 45 randomly selected hauls for the third quarter survey. For both surveys hydrographical data are collected with a CTD in connection to the trawl hauls. Each haul are sorted and all species are recorded, length measured and weighed. For target species biological parameters are collected on fish length, age, weight, sex and gonadal maturity. In case of large catches subsampling is performed. Marine litter is registered from each haul.

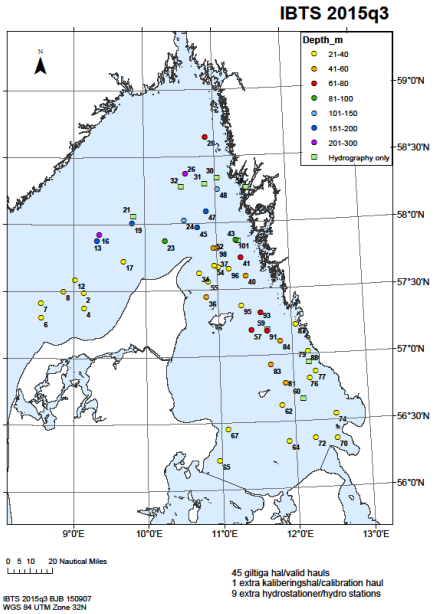
Further details are explained in the International Bottom Trawl Survey (IBTS) manual:
http://datras.ices.dk/Documents/Manuals/Manuals.aspx



Map 4. Hauls with GOV demersal trawl IBTS first quarter survey 2016.



Map 5. Hauls with MIK larvae trawl during IBTS first quarter survey 2016.



Map 6. Hauls with GOV demersal trawl IBTS third quarter survey 2015.

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

The Danish R/V DANA is chartered for the surveys in the Kattegat and Skagerrak. Participating Member states in the surveys are: Sweden, Denmark, Germany, England, Scotland. The IBTS survey is coordinated by the International Bottom Trawl Survey Working Group (IBTSWG) and the data are uploaded to the international ICES database DATRAS. Data on marine litter is reported to the ICES marine litter database

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

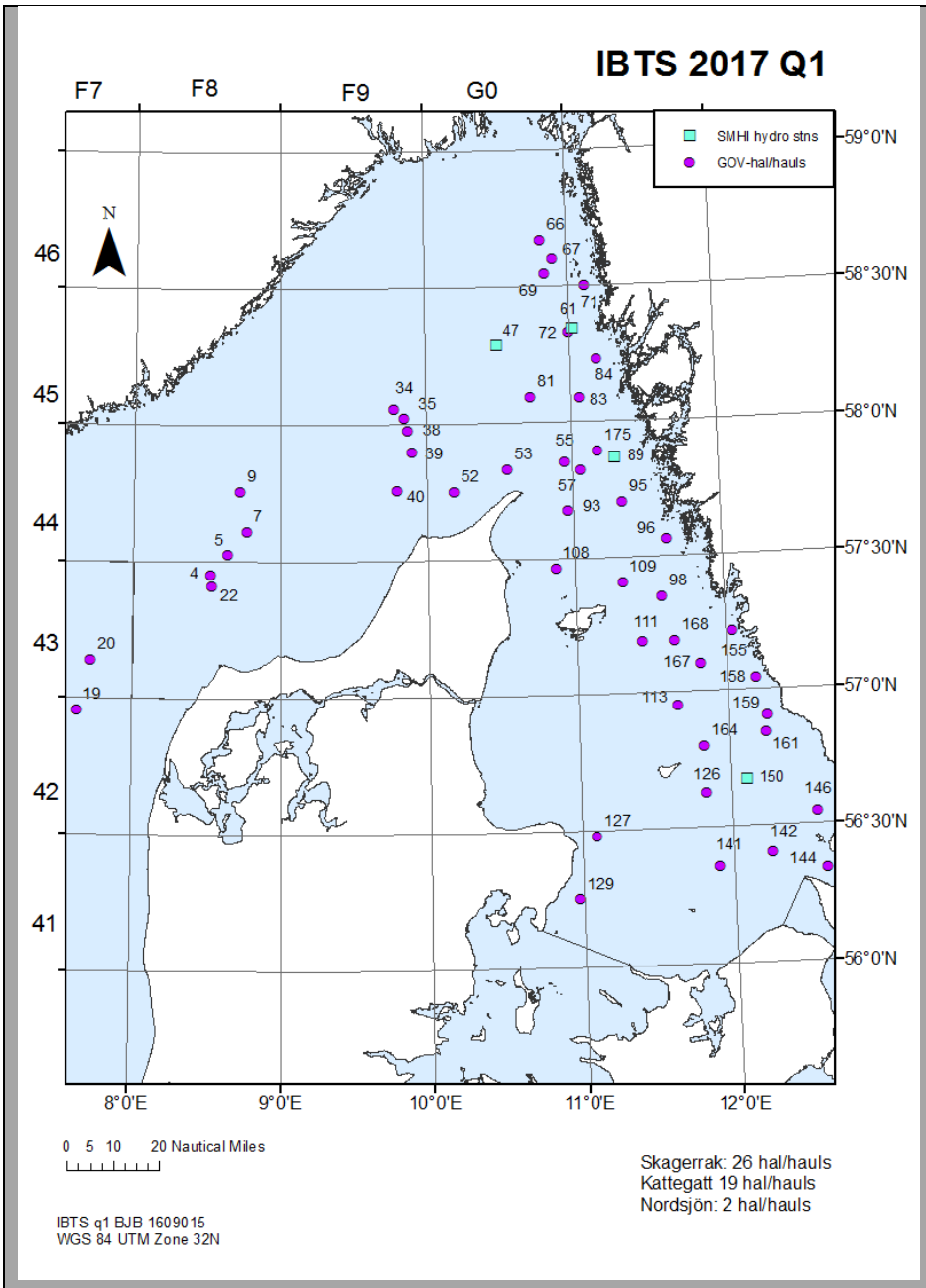
Since 2011, Sweden has used the Danish vessel R/V DANA in the IBTS surveys and a cooperation agreement between Sweden and Denmark has been established were all the practical details (price, payment, staff etc) for smooth cooperation are described. Latest agreement signed is valid until 31 Dec 2017.

5. Explain where thresholds apply

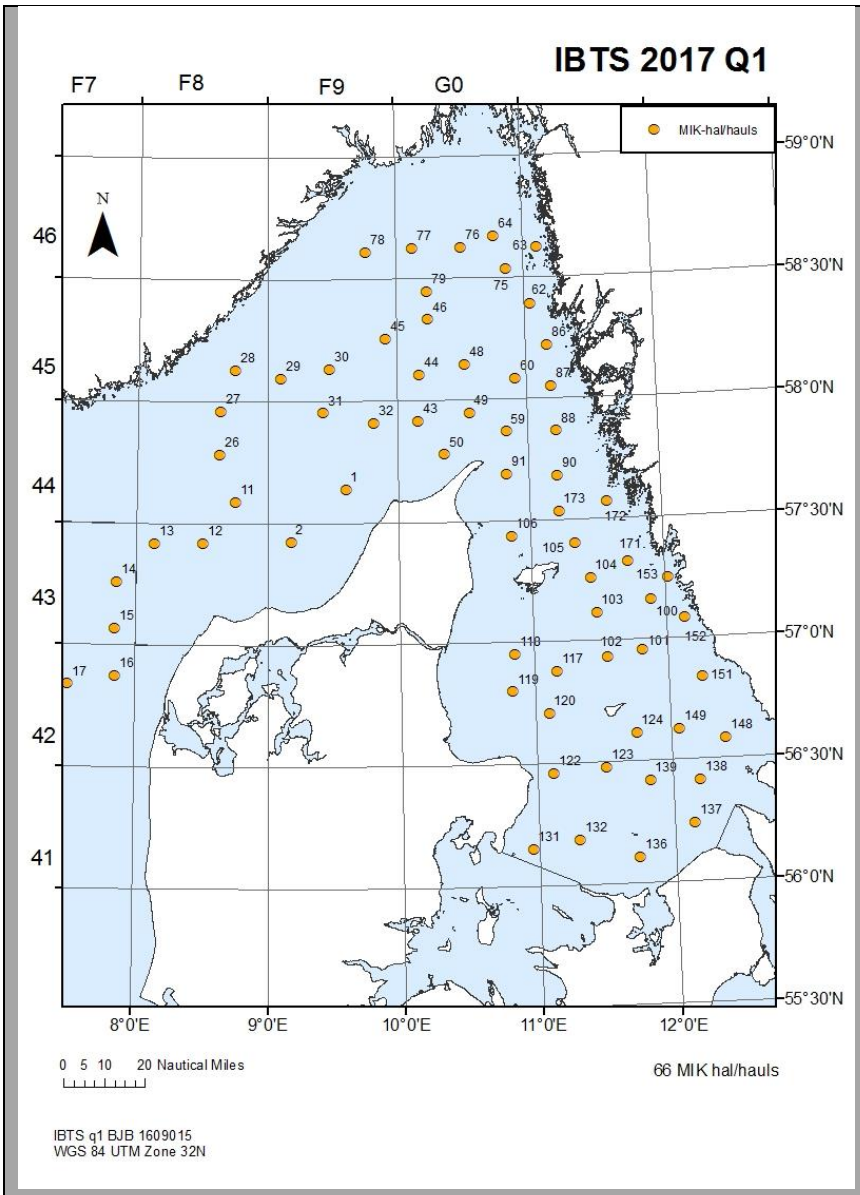
No threshold applies to the IBTS surveys**.**

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

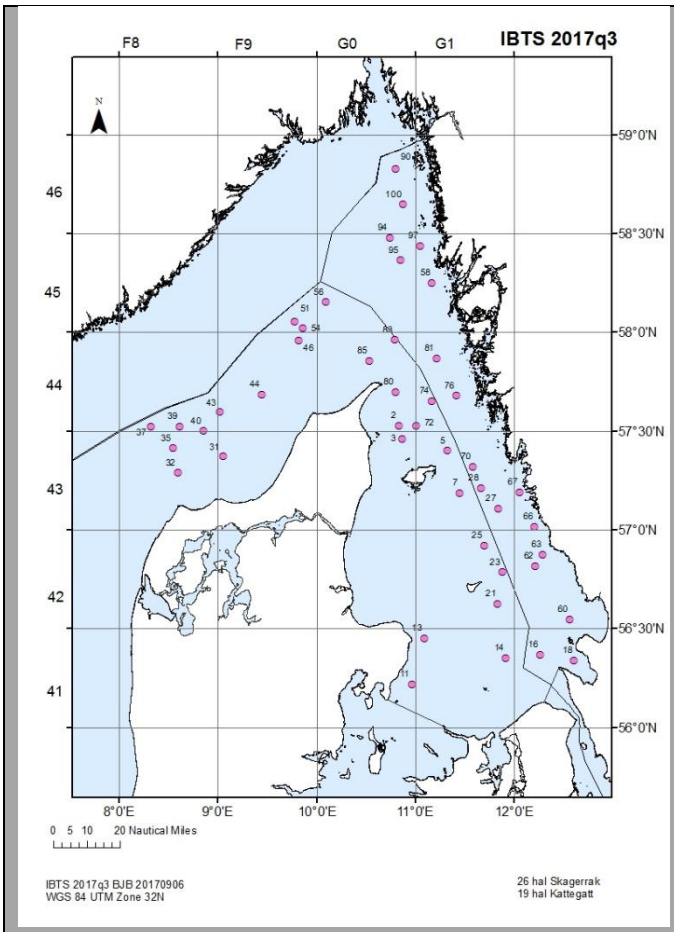
Member State shall provide maps presenting the spatial distribution of the main sampling types obtained during the survey.



Map 4. Hauls with GOV demersal trawl IBTS first quarter survey 2017.



Map 5. Hauls with MIK larvae trawl during IBTS first quarter survey 2017.



Map 6. Hauls with GOV demersal trawl IBTS third quarter survey 2017.

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

http://ices.dk/sites/pub/Publication%20Reports/Expert%20Group%20Report/SSGIEOM/2017/IBTSWG/IBTSWG%202017.pdf

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

Indices for ICES assessment groups HAWG, WGBFAS, WGNSSK.
Litter is a MFSD-descriptor and used by OSPAR.

9. Extended comments (Tables 1G and 1H)
No additional comments.

NTV 3&4 – NEPHROPS TV SURVEY IN FUNCTIONAL UNIT 3 & 4

1. **Objectives of the survey**

The main objective of the survey is to provide abundance estimates for mud-burrowing animals like *Nephrops*.

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

The fishery independent Underwater TV survey (UWTV) is performed by having a video camera mounted on a sledge that is towed slowly (0.5-0.8 knot) on the bottom while recording the bottom substrate. The video recording is analysed and *Nephrops* burrows are counted and converted into densities using information on the width of the view of the camera and length of the tow. Dead removals (landings and dead discards) together with mean weight from biological samplings are used to estimate stock biomass.

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 a joint survey with Denmark. The survey has so far been run on a Swedish vessel and Danish vessel for the Swedish part and a Danish vessel for the Danish part. The aim was to use the Danish vessel for the whole area in 2017, and that Swedish scientific staff should be onboard covering the Swedish share of the survey. The Danish vessel did not get permission to all applied stations (for military reasons) so we had to use the Swedish vessel Asterix in the most coastal areas.

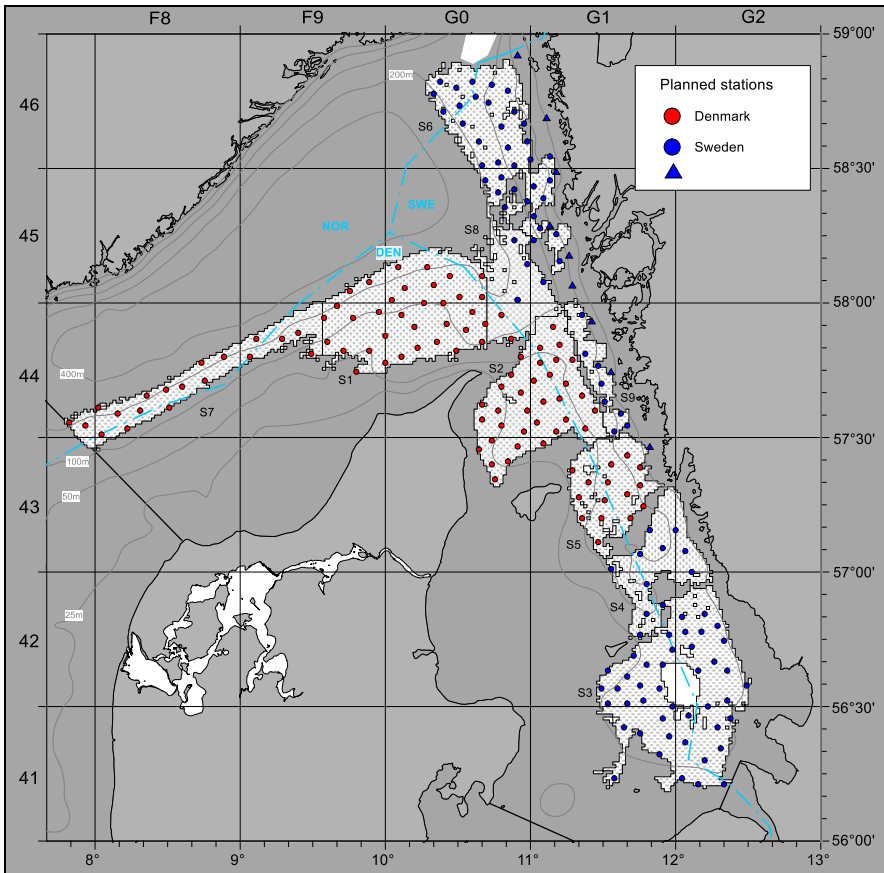
4. **Where applicable, describe the international task-sharing (physical and/or financial) and the cost-sharing agreement used**

The future agreement we are aiming for, will also cover sharing of equipment, payment and staff.

5. **Explain where thresholds apply**

No thresholds apply to the survey

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



Map 7. Planned sledge UWTV stations for Denmark and Sweden for the survey in 2017 in the defined sub areas of the *Nephrops* stock in IIIa.

Not all stations could be visit due to bad weather, too low visibility, rocky bottoms or too many creels.

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

The survey is coordinated by the ICES working group on Nephrops surveys (WGNEPS).
The manual for the survey can be found at final report of the Working Group on *Nephrops* Surveys (WGNEPS). http://www.ices.dk/community/groups/Pages/WGNEPS.aspx
The latest *Nephrops* assessment results can be found at the final report of the on the North Sea, Skagerrak and Kattegat Working Group (WGNSSK). http://ices.dk/community/groups/Pages/WGNSSK.aspx

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

The results are used to quantify the abundance of Norway lobster (*Nephrops norwegicus*) in the Skagerrak and Kattegat as an ICES recommended method for stock assessment of *Nephrops*.

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

No additional comments.

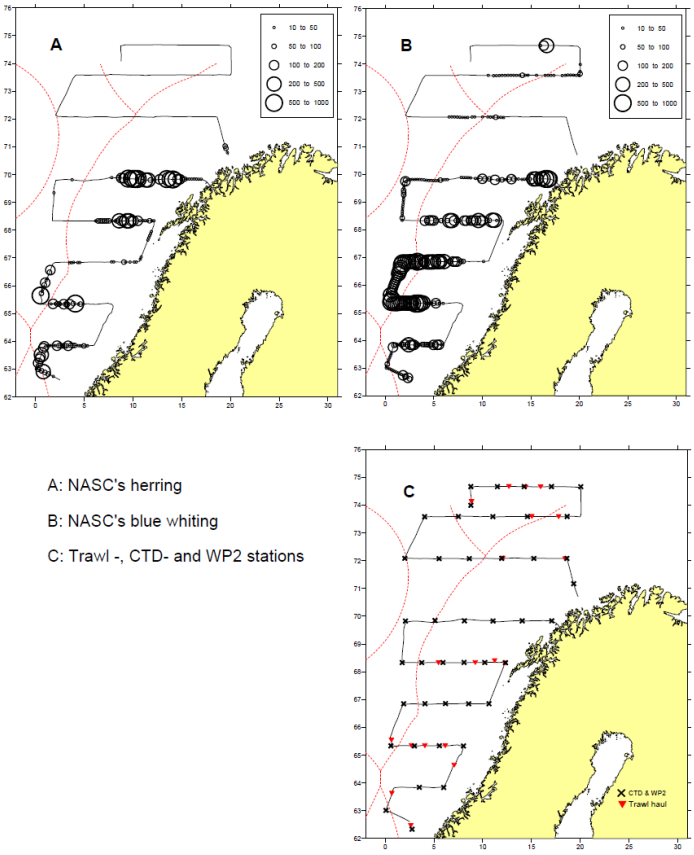
ASH – Atlanto Scandian Herring survey

1. **Objectives of the survey**

The aim is to investigate distribution and migrations of the Atlanto-Scandian herring, blue whiting and other pelagic fish and to produce a biomass index for herring and a recruitment index for blue whiting. Furthermore, hydrographic conditions and plankton abundance in the Norwegian Sea and adjacent waters are monitored in order to investigate distribution and migration of herring and other pelagic fishes are influenced by environmental conditions.

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

The survey is collecting acoustic data, biological data like species composition and length measurements. For the target species herring and blue whiting data are collected on length, weight, sex, maturity and age (from scales of herring and otoliths of blue whiting). In addition zooplankton hauls are made using a WP2 net and hydrographical data are collected using a CTD.



Map 8. Example from ASH 2013; Dana survey track, pelagic trawl, CTD and WP2 stations**.**

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 carried out as a joint EU survey using the Danish vessel R7V DANA with participation of UK, Ireland, Netherlands, Germany, Sweden and Denmark. The survey is coordinated by the ICES Working Group of International Pelagic Surveys, WGIPS.

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

Sweden is contributing by sending two staff participating in the survey as well as a cost-sharing model based on the share of TAC is applied according to an agreement. Denmark is responsible country for reporting of the results from the survey to the relevant ICES working group.

5. Explain where thresholds apply

No thresholds apply to the survey.

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

For details see Annual Report Denmark.

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

For details see Annual Report Denmark.

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

For details see Annual Report Denmark.

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

For details see Annual Report Denmark.

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

Logbook data are automatically checked when filled in regarding completeness and also regarding logic. In addition, random checks are performed later on catches landed compared to those sold and also given geographic positions compared to VMS data. The fishery control also checks and verifies logbook data for the specific trip when a control is performed. Finally there are also computerized routinely performed checks of the complete logbook data to find abnormal and exorbitant values for all trips.

Journal data are automatically checked when filled in regarding completeness and also regarding logic. Since the data is on monthly bases no further checks can be done on administrational or field bases. There are computerized routinely performed checks of the complete journal data to find abnormal and exorbitant values for all trips.

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

Value by vessel and trip is estimated by estimating average prices per year, month, subdivision, and gear if it exists. If it doesn't exist price it goes one level up in the hierarchi and tries again and so on.

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

Averages prices is calculated from tripdata by values (see 2.). Meaning that they are weighted on the amout caught.

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

A complementary data collection is in place for vessels below 10 meters. The sample plan is census based and they report in a so called fishing journal instead of the standardized logbook. The journal is filled in once every month with a finite number of fishing trips per journal. If a fishermen have many fishing trips he/she will have to fill in several journals each month to cover all of the fishing trips. Type of data collected are almost the same as the lokbook, number of days, type of gear, catch, spatial allocation etc. The data is not as detailed as the lokbook data but it is sufficient for analysis and control purposes.

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

There has been no deviations from the work plan methodology.

Note:

In WP 2017 in table 2A (Excel), regarding vessels <10 meter, it was stated that there were a complementary data collection for capacity, effort and landings. Although, the answer to question 4 in text box 2A were "No complementary data needed", which is not in line with the information provided in the excel file.

The census collection scheme filled in in WP 2017 table 2A, row 5,6,9,10,13,14 (Excel) should be considered as a complementary data collection, as it is not regulated on EU level.Thus, the answer to question 4 in textbox 2A is incorrect. We have complementary data collection, using a census collection scheme based on monthly journals.

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

There is no methodology to choose the source of data. Data in registers are available and used and excess data needed, like some costs variables, will be obtained in census by surveys since it is mandatory for the fishery to reply.

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

All variables for economic and social data for fisheries will be collected in census. There is no methodology to choose different types of data collection. Data in registers at SwAM are available and used, and excess data needed, like some costs variables, capital values and social variables, will be obtained in two separate census mail-surveys. One survey for economic data and one for social data. It is mandatory for the fishery to reply. The survey will be send by letter-mail because it is the simplest and cheapest way. No e-mail addresses exist for the complete fishery and collection by phone is too expensive. Data on subsidies is included in the economic survey but also for cross-checking gathered from the databases on the EMFF at the Swedish Board of Agriculture.

Other income, capital values, wages and salaries of crew as well as financial position is also gathered in census from the income tax declarations register of all vessel owners. This data is compiled by Statistics Sweden (SCB).

The inactive fleet will not be covered by the collection since they by definition doesn't have any costs related to fisheries. Data are however gathered on vessel characteristics, effort, which by definition is zero, and capacity (fleet indicators). By experience, the capital value and capital cost of the inactive vessels is similar to capital value and capital cost of active vessels. Therefore capital costs and capital value will be estimated from data of active vessels with the same main gear type as the inactive vessels used when they were last active and fishing.

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

All variables for economic and social data for fisheries will be collected in census.

4. Description of methodologies used for estimation procedures

The Swedish fishing fleet are rather small. Clustering is needed due to confidentiality reasons and therefore all estimations are done on clustered segment. Since the survey is done on all vessels, in census, re-clustering for analytical reasons can be done easily.

Missing data, due to vessels sold, vessel owners that passed away etc., will be taken care of by weighting and calculating weighted averages using days at sea.

An allocation key to allocate the total variable cost to the different cost variables will be estimated through the questionnaire (census letter-survey). The concerned cost variables are energy costs, repair and maintenance costs, variable costs and non-variable costs. Total costs from tax declarations are used to calibrate the results at the correct total level of costs to be used for the allocation key.

5. Description of methodologies used on data quality

Logbook data are automatically checked when filled in regarding completeness and also regarding logic. In addition, random checks are performed later on catches landed compared to those sold and also given geographic positions compared to VMS data. The fishery control also checks and verifies logbook data for the

specific trip when a control is performed. Finally there are also computerized routinely performed checks of the complete logbook data to find abnormal and exorbitant values for all trips.

Journal data are automatically checked when filled in regarding completeness and also regarding logic. Since the data is on monthly bases no further checks can be done on administrational or field bases. There are computerized routinely performed checks of the complete journal data to find abnormal and exorbitant values for all trips.

Survey data is checked by computerized routines for finding abnormal and exorbitant values. Tax register data are checked in numerous ways at the tax authority.

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

No deviation.

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

No deviation.

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

No deviation.

9. Deviations from Work Plan methodology used for estimation procedures

No deviation.

10. Quality assurance

10.1 Sound methodology

The data collection regarding economic and social data follow best practices and guidelines decided by expert groups, e.g. PIM-methodology regarding splitting of capital costs. Methodologies used are documented.

10.2. Accuracy and reliability

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

Throughout the whole data management process data checks are done frequently. Raw data are being processed before compiled to intermediate results. When intermediate results are produced, several extensive data checks are in place to assess and validate the data. Every error and correction/imputation is well documented and dealt with according to guidelines and best practices.

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.havochvatten.se/

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).

The pilot study of data on employment by educational level and nationality will be conducted in two separate pilot studies.

Fisheries

1. Aim of pilot study

The aim of the study is to get data to be used in management of the fishery.

2. Duration of pilot study

The pilot study will be incorporated in the socio-economic data collection of Sweden and therefore also performed in census without time limit.

3. Methodology and expected outcomes of pilot study

The collection will be done together with other socio-economic data in a mail survey. The survey will be send to all vessel-owners (active vessels). It will be compulsary to answer. Expected outcomes depends on how the questionnarie is constructed and how education is defined and put forward so it relates to fishing.

Aquaculture

1. Aim of pilot study

The aim of the pilot study is to specify methology to undertake collection of data on employment by educational level and nationality.

2. Duration of pilot study

Autumn 2017 – spring 2018

3. Methodology and expected outcomes of pilot study

Pilot study will be conducted in cooperation with Statistic Sweden. Expected outcome is that data on educational level is possible to attain by existing register, and will be collected in order to examine usuability. As a preliminary outcome from discussions with Statistical Sweden there are no register for nationality linked to employment in Sweden. Further examination and discussion on the subject will be a major part of the pilot study.

Fisheries

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

The pilot study regarding fisheries and social data was never carried out during 2017. Due to the agreed sampling scheme and methodology, there were no reason to conduct a pilot study. The collection of social data will be collected together with cost data, which is using a sound and tested methodology. Thus, there were no reason for a pilot study to test methodology or sampling scheme.

5. Incorporation of results from pilot study into regular sampling by the Member State

Not applicable.

Aquaculture

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

It was not possible to attain education and nationality from any existing register. All the social variables; gender, age, education and nationality have instead been collected by a questionnaire sent to all aquaculture enterprises. The questionnaire was developed in cooperation with Statistics Sweden and was incorporated into the already existing questionnaire (Q2) (see 3B) which is collected every three years.

5. Incorporation of results from pilot study into regular sampling by the Member State

The questionnaire will become a part of the regular sampling and sent to all enterprises every three years.

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. Description of methodologies used to choose the different sources of data

Data will be collected by Statistics Sweden and Swedish board of Agriculture in four ways.

a. Statistics Sweden: Income tax declarations from every enterprise whose main source of income (more than 50 %) comes from aquaculture will be compiled.
b. Statistic Sweden: A questionnaire (Q1) about farming techniques, investments, production value and volume will be sent to all aquaculture farms. The questionnaire will give additional information that makes it possible to cluster farming units to enterprises in cases when several farming units are equal to one fiscal enterprise. It will also make it possible to compare information on value of aquaculture production with declared income from income tax declarations. These comparisons are needed to be able to classify the aquaculture farming as main acitivity of the enterprise or not.
c. Statistics Sweden in cooperation with Swedish board of Agriculture: A second questionnaire (Q2) will be sent to all of the aquaculture enterprises in order to create a cost allocation key for costs that are not specified in the income tax declaration.
d. Swedish board of Agriculture: Data on subsidies will be collected from the Swedish board of Agriculture existing systems, the managing authority of the European Maritime and Fisheries Fund (EMFF), and will be compiled by Swedish board of Agriculture.

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

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency of final data. Quality of the data collected by Swedish board of Agriculture is secured by using existing system for disbursement.

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

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency of final data. Data on variables of production and data on the economic variables not included in the financial accounts (imputed value of unpaid labour, energy cost, livestock volume and cost, feed volume and cost, repair and maintenance, other operational cost, extraordinary cost) will be collected from answers from questionnaires conducted by Statistics Sweden which ensures the consistency of final data. Data on subsidies will be compiled from existing system of disbursement, whereafter an allocation will be made to distribute subsidies to appropiate segment.

4. Description of methodologies used for estimation procedures

A questionnaire (Q1) about farming techniques, investments, production value and volume will be sent to all aquaculture farms. The questionnaire will give additional information that makes it possible to cluster farming units to enterprises in cases when several farming units are equal to one fiscal enterprise. It will also make it possible to compare information on value of aquaculture production with declared income from income tax declarations. These comparisons are needed to be able to classify the aquaculture farming as main acitivity of the enterprise or not. Questionnaire 2 (Q2) is used for make estimations on costs not included in tax declaration. Respondents result will be assigned to proper segment by Statistical Sweden for producing a cost allocation key by using means from each segments.

5. Description of methodologies used on data quality

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency and quality of final data. Questionnaire Q1 is evaluated by Statistics Sweden. They conduct telephone interviews with aquaculture enterprises when there are incomplete answers, unreasonable answers or non-responses. Due to experience there will not be necessary to assess the likely impact of non-response bias on survey estimates since the response rate on these types of questionnaires is nearly 100 % due to legislative reasons. Questionnaire Q2 is conducted and evaluated by Statistics Sweden in cooperation with Swedish board of Agriculture every third year to create an updated cost allocation key. Statstic Sweden conduct this questionnaire by sending out questionnaires with several reminders. Response rate is around 60 percent. The quality of data on subsidies is evaluated by Swedish board of Agriculture by comparison with previous years disbursements and programme budget.

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

The questionnaire (Q2) was complemented with social variables (see Pilot Study 3). This deviation was due to problems with attaining social data from existing registers. It was a pilot study and this procedure will be a part of the Work Plan in the future.

Due to a low response rate on Q2 the development of the methodology for retaining this data will continue. The industry requests fewer and digitalised questionnaires to minimize the administrative burden. The Swedish Board of Agriculture works together with Statistics Sweden to minimize administrative burdens and improve sample rate.

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 from WP. However, due to confusion about which segmentation to use the data collected in 2017 (production year 2015) is segmented according to the old implementing decision (2008/949/EG), Table XI.

9. Deviations from Work Plan methodology used for estimation procedures

No deviations

10. Quality assurance

No deviations.

10.1 Sound methodology

For questionnaire Q1 there is a quality report publicly available which describes methodology and quality assurance. Questionnaire Q2 has no such description publicly available, but all data collection follows agreed practices in expert groups.

10.2. Accuracy and reliability

Response rate and Achieved sample rate are provided in Table 3B.

For Q1 data checks are done according to check lists following agreed routines for quality assurance within Statistics Sweden. Corresponding checks are done for Q2, by Statistics Sweden and Swedish Board of Agriculture in cooperation.

10.3. Accessibility and Clarity

Are methodological documents publicly available?

- Yes for Q1 a quality report is publicly available.

Are data stored in databases?

- Yes

Where can methodological and other documentation be found?

- www.scb.se

Provide the web link, if documentation is publicly available

- https://www.scb.se/contentassets/1053bf51c1744233b29e7b17172a5c30/jo1201_kd_2016.pdf

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. Aim of pilot study

Aim of the pilot study is to explore the possibilities to collect environmental data on aquaculture by develop existing data collection on production.

2. Duration of pilot study

Autumn 2016 – spring 2017

3. Methodology and expected outcomes of pilot study

Development of existing data collection on aquaculture production to include enivironmental data there will be a reliable and easily attainable data source on the subject with well establish routines. Data collection on aquaculture production is an annual questionnaire (Q1) to all enterprises in aquaculture sector.

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

Environmental data on mortality has been successfully incorporated in the annual production questionnaire (Q1). Data on mortality will be available from production year 2017 reported in 2019.

Environmental data on treatments are reported to the Swedish Board of Agriculture every year and will be accessible for collection when needed.

5. Incorporation of results from pilot study into regular sampling by the Member State

Mortality will be collected every year in the annual production questionnaire (Q1). Treatments are accessible for collection when needed (every 2nd year).

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

The data presented comes mainly from official statistics that has been collected and processed by Statistics Sweden through the SRU register which is maintained by Statistics Sweden and consists of income tax declarations in Sweden. Part of the data will be collected from the Statistical Business Register which is a central register consisting of information on all registered enterprises in Sweden. It is also maintained by Statistics Sweden. Another part of the data will be collected from Labour market statistics, which is a central register that is maintained by Statistics Sweden.

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

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

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

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. Data on two variables (energy costs and subsidies) will be collected from answers from a questionnaire sent out by Statistics Sweden based on PPS-selection in the Statistical Business Register. The questionnaire is used as a base for estimating an allocation key for variables not included in the financial accounts. The sampling method for the variables collected with probability sample survey is Probability Proportional to Size (PPS sampling) where the sum of total income and total costs is used to select which enterprises that will be sampled.

4. Description of methodologies used for estimation procedures

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. Data on two variables (energy costs and subsidies) will be collected from answers from a questionnaire sent out by Statistics Sweden based on PPS-selection in the Statistical Business Register. The questionnaire is used as a base for estimating the variables (including energy costs and income from subsidies) not included in the financial account.

5. Description of methodologies used on data quality

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. The data quality evaluation is carried out by Statistics Sweden before delivering it to the Board of Agriculture, who conducts a macro evaluation upon delivery to ensure no abnormal or implausible changes have occurred by comparing the new data with previous years.

Sampled data is reviewed on a micro level by Statistics Sweden regarding summations, plausibility and relationships between variables. Outliers that may have a large effect on the estimation are checked and evaluated. Census data from the Swedish Tax Agency and the Statistical Business Register is evaluated by Statistics Sweden although not to such a large extent as sample data. The evaluation of census data mostly consists of reviewing suspiciously extreme values that may be small or large. After reviewing the data on a

micro level the data is processed to correct for non-responses. After merging the census and sample data the aggregate is checked and evaluated at a macro level. In the last step no difference is made between sample and census data.

For variables, such as subsidies and energy costs, collected through the probability sample survey CV values are estimated to display the uncertainties due to sampling. A possible shortfall is that although data is collected, processed and ensured by Statistics Sweden, some variables are not available through financial accounts. The variables affected by this possible shortfall are subsidies and energy costs. The reason for this is that those variables were solely collected through questionnaires and there is a certain range of uncertainty of these variables and it is also difficult to control if they are correct. There are some shortfalls when it comes to subsidies, but it is not a good solution to obtain subsidies from the administrative records. The reason is that we are using Statistic Sweden's standardized method to obtain the financial information for the processing industry and we do not see that we have any option to change this method.

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

There are no deviations from the methodology used to select data source compared to what was planned in the Work Plan.

In the Work Plan for 2017 Sweden stated that it might not be possible to calculate imputed value of unpaid labour, but Sweden managed to calculate this for 2017.

According to Work Plan for 2017 Sweden reported the total sum of subsidies, not seperated by operating subsidies and subsidies on investments. According to Work Plan, Sweden did not report unpaid labour and number of hours worked.

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

There are no deviations from the methodologies to choose type of data collecton scheme compared to what was planned in the Work Plan.

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

There are no deviations from the methodologies used regarding sampling frame and allocation scheme compared to what was planned in the Work Plan.

9. Deviations from Work Plan methodology used for estimation procedures

There are no deviations from the methodologies used for estimation procedures compared to what was planned in the Work Plan.

10. Quality assurance

10.1 Sound methodology

The data collection follows methodologies, guidelines and best practices agreed in expert groups. All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data.

10.2. Accuracy and reliability

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

The achieved sample rate and respond rate is 100 % for variables collected through financial accounts by Statistics Sweden. For subsides obtained from questionnaires the corresponding achieved sample rate is 94 % and the response rate 94 %. Comprehensive validations were made during the compilation of the data and figures were cross checked with other data sources by Statistics Sweden, when possible.

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?

yes

The weblink goes to Statistics Sweden where the official data can be found. https://www.scb.se/hitta-statistik/statistik-efter-amne/naringsverksamhet/naringslivets-struktur/foretagens-ekonomi/

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. **Description of the sampling plan according to Article 5 paragraph (3) of the Decision (EU) 2016/1701**

Sweden is currently in the process of moving towards 4S in the commercial sampling. Preparation of detailed descriptions of the sampling design for the different sampling schemes is one important part in this process.

Evaluation, development and improvement of the remaining sampling schemes are underway and Sweden aims to have a fully developed 4S data collection running in 2018.

This goal applies for all sampling with the exception of cases where end users may set other requirements. For example, eel sampling may have to be performed in a different way. This holds if the data needs are not possible to meet by commercial 4S sampling. This could be due to either fisheries management measures related to the Swedish national eel management plan or in case there are other objectives in the stock assessment that needs to be taken into account.

BALTIC SEA

Scheme: Baltic at-sea

Purpose: At-sea Observer Programme for length, age, weight data of landings and discards of demersal species in the Baltic Sea (Subdiv 22-32)[1]

Main end-users: ICES WGBFAS; National fisheries management agency; Scientific research projects;

Design: Multi-stage

Main stratification: 1 fishery stratum (see details in Table 4A)

Temporal Stratification: Quarterly

Spatial Stratification: none

Stratum: SWE - Balt (at-sea) - Act - 24/25 – DemTrawl

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of vessels active in the Demersal trawl	Vessel	Quarterly	random draw from vessel list with unequal probability	6 (per quarter)

[1] The sampling scheme complements sampling carried out in schemes “Baltic self-sampling” and “Baltic at-sea or self-sampling” by extending data collection to additional stocks and discards of demersal trawlers

	fishery in subdiv 24 or 25 during 2016			(probability proportional to number of trips)	
2SU	Hypothetical list of trips from vessel	Fishing Trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
3SU	Hypothetical list of hauls in trip	Haul	---	Census	Census
4SU	Hypothetical list of individuals caught in haul	Individuals	Species x Catch Fraction x Commercial Size Category Biology: also 1cm length classes	Length: Census (random sample if too large) Biology: Census (random sample if too large); sampling stops when trip goals are achieved	Length: all individuals Biology: COD discards: 5 otoliths and individual weights (per size class and trip) FLE discards: 5 otoliths and individual weights (per size class and trip)

Main limitations: Quota sampling for ages and weights may not ensure proper spatial coverage of the most abundant size classes;

Expected difficulties: There is risk for refusals related to landing obligation and other management measures; usage of random vessel lists in sampling the demersal trawl strata is statistically sound but may bring about low coverage in some subdivisions.

Expected coverage of target population (based on expected trips and 2013-2015 average number of trips per strata):

- SWE - Balt (at-sea) - Act - 24/25 – DemTrawl: 1.9%

Scheme: Baltic self-sampling

Purpose: Self-sampling programme for length, age, weight data of landings of demersal fisheries in the Baltic Sea (Subdiv 22-32)[2]

Main end-users: ICES WGBFAS; National fisheries management agency; Scientific research projects;

Design: Multi-stage

Main stratification: 1 fishery stratum (see details in Table 4A)

Temporal Stratification: Quarterly

Spatial Stratification: None

Stratum: SWE - Balt (self) - Act - 22/32 - DemTrawl

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort

[2] The sampling scheme complements sampling carried out in schemes “Baltic at-sea” and “Baltic at-sea or self-sampling” by supplementing data collection of trawl catches of cod stocks

1SU	List of weeks of the year	Week	Quarterly	random draw from week list without replacement	8 (per quarter)
2SU	List of vessels active in the Demersal trawl fishery in all Baltic subdivisions during 2016	Vessel	---	Random selection from quarterly vessel list	4 (per week) (*)
3SU	Hypothetical list of daily landings of cod from vessel in week	Daily landing of cod	---	ad-hoc (performed by buyer)	1 (per vessel)
4SU	All boxes of cod landed in fishing trip	Boxes of cod	Commercial Size Category	ad-hoc (performed by buyer)	1 box (**)
5SU	All individuals in the box	Individuals (individual length, weight and age)	None	Length: Census Biology: Random sample or census (depending on size category)	Length: all individuals in box Biology: Sizes 1-3: all otoliths and weights Size 4: 20 otoliths and weights + 20 fish only weight Sizes 5-7: 10 otoliths and weights + 10 fish only weight

(*) to ensure coverage of areas with less activity, buyers are also instructed to deliver full samples from additional landings from subdivision 24 whenever fleet activity occurs in that subdivision and vessels are not on the list;

(**) n=1 additional box is requested from sizes 1-3 from another vessel to ensure less frequent size classes are sampled.

Main limitations: Reduced control over the selection of box(es) within size category;

Expected difficulties: There is risk for refusals or reduced fleet activity related to landing obligation and other management measures (e.g., temporal closures); usage of random vessel lists in sampling the combined subdivisions (e.g., 22-32) is statistically sound but may yield low sample size in some of the subdivisions.

Expected coverage of target population (based on sampling targets and 2013-2015 average number of trips per strata):

- SWE - Balt (self) - Act - 24/25 – DemTrawl: 9.9%

Scheme: Baltic "at-sea or self-sampling"

Purpose: At-sea observer or self-sampling programme for length, age, weight data of landings and discards of demersal species in the Baltic Sea (Subdiv 22-32)[3,4].

Main end-users: ICES WGBFAS; National fisheries management agency; Scientific research projects;

Design: Multi-stage

Main stratification: 6 fishery strata (see table 4A)

Temporal Stratification: Quarterly

Spatial Stratification: Subdivision

All strata (if at-sea)

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year	Week	Quarterly	random sample from week list without replacement	Gillnets: 8 (per quarter) Longlines: 6 (per quarter)
2SU	List of vessels active in the gillnetter or longlines fisheries for demersal species in specific subdivisions during 2016	Vessel	---	Random sample from quarterly vessel list without replacement	2 (per week)
3SU	Hypothetical list of weekly trips from vessel	Fishing Trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
4SU	Hypothetical list of hauls in trip	Haul	---	Census	Census
5SU	Hypothetical list of individuals caught in haul	Individuals	Species x Catch Fraction x Commercial Size Category Biology: also x 1cm length classes	Length: Census (random sample if too large) Biology: Random sample or census (within length class) sampling stops when trip goals are achieved	Length: all individuals Biology: COD discards: 5 otoliths and individual weights (per size class and trip) FLE discards: 5 otoliths and individual weights (per size class and trip)

[3] Priority will be given to at-sea data collection. Self-sampling will be used if logistics, safety issues or refusals do not allow the implementation of at-sea sampling.
[4] The sampling scheme complements sampling carried out in schemes “Baltic at-sea” and “Baltic self-sampling” by extending data collection to landings and discards of passive gears fishing demersal species.

All strata (if self-sampling)

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of weeks of the year	Week	Quarterly	random sample from week list without replacement	Gillnets: 8 (per quarter) Longlines: 6 (per quarter)
2SU	List of vessels active in the gillnetter or longlines fisheries for demersal species in specific subdivisions during 2016	Vessel	---	random sample from quarterly vessel list without replacement	2 (per week) until 4 trips in quarter are achieved
3SU	Hypothetical list of weekly trips from vessel	Fishing trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
4SU	All boxes of catch kept during fishing trip	Boxes	Species x Catch fraction x Commercial Size Category	Census or "random" sample by observer	Cod Landings: size (1-3): all boxes (or a sample of boxes) size (4-7): 1 box Other species landed and discarded: all boxes
5SU	All individuals in the box	Individuals (individual length, weight and age)	None	Length: Census Biology: Random sample or census (depending on size category)	Length: all individuals in box Biology (per size): COD Sizes 1-3: all otoliths and weights COD Sizes 4-5: 20 otoliths and weights + all remainder fish only weight COD Sizes 6-7: 20 otoliths and weights + 20 fish only weight

Main limitations: lack of control over the sampling requires significant *a posteriori* checks for sampling biases; Quota sampling for ages and individual weights in at-sea sampling jeopardizes spatial coverage of the most abundant size classes

Expected difficulties: There is risk for refusals or reduced fleet activity related to landing obligation and other management measures (e.g., temporal closures); usage of random vessel lists in the sampling of combined subdivisions (e.g., 27-29) is statistically sound but may yield low sample size in some of the subdivisions.

Expected coverage of target population (based on expected trips and 2013-2015 average number of trips per strata):

- SWE - Balt (sea/self) - Pass - 23 – Nets: 0.6%
- SWE - Balt (sea/self) - Pass - 24 – Nets: 1.2%
- SWE - Balt (sea/self) - Pass - 25 – Nets: 0.5%
- SWE - Balt (sea/self) - Pass – 27-29 - Nets: 0.7%
- SWE - Balt (sea/self) - Pass - 24 - Longlines: 7.6%
- SWE - Balt (sea/self) - Pass - 25 - Longlines: 1.7%

Scheme: Baltic at-sea 2

Stratum KBWE2 and KBEE2/KBEE3

Scheme: Sampling is set up by contacting preselected fishermen. In connection with their silver eel pound net fishery, the fishermen sign up on a yearly basis for 1) a number of métier sampling trips and 2) collection of eel for stock sampling. Additionally, it is possible to sign up for recording effort and eel landings in a voluntary daily logbook. These data are a complement to the official landing statistics and may also include discards and seal- and bird-induced damage. Each fisherman can have several vessels. Observers choose which trip they visit the fishermen to perform the métier sampling. Preliminary 2017 set-up: 1 fisherman in SD 23, SD 25 and SD 27 respectively. In total, 8 métier sampling trips are planned.

Scheme: Baltic onshore sampling

Stratum KBN3

Scheme: Sampling is set up by contacting preselected vessels (fishermen). In connection with their herring trawl fishery, the fishermen sign up on a yearly basis for a number of métier sampling trips. The fishermen choose randomly (by themselves) which trip (haul) they collect samples from[5]. These samples are later processed by staff at SLU Aqua. Depending on how many vessels that are trawling for herring in SD30 there can be 1 to 4 fishermen involved. Preliminary 2017 set-up: 1 trawler active. In total, 12 métier sampling trips are planned.

Stratum KBN4

Scheme: Sampling set up by contacting preselected fishermen. In connection with their herring gill net fishery, the fishermen sign up on a yearly basis for 1) a number of métier sampling trips and 2) collection of herring for stock sampling. Each fisherman can have several vessels. The fishermen choose randomly (by themselves) which trip they collect samples from[5]. These samples are later processed by staff at SLU Aqua. Preliminary 2017 set-up: 3 fishermen in SD 30 and in SD 31 respectively. In total, 12 métier sampling trips are planned.

Stratum KBN5

Scheme: Sampling from preselected vessel pairs (fishermen) assumed to be a good subsample of the total vendace fishing fleet. Fishing is not randomly distributed throughout the whole fishing ground. Instead, it takes place in different areas that are separated from each other and therefore, the sampling is stratified on 5 predefined local fishing areas. Trips are chosen haphazardly, where samples are collected in the beginning of the 1st, 3rd and 5th fishing week. Sampling is performed by sub-contractor County administrative board of Norrbotten. Preliminary 2017 set-up: In total, 9 vessel pairs participate in the sampling (the vessels that form pairs are always the same). Before going out sampling, 1 out of the 5 predefined fishing areas within the SD is chosen and then one of the preselected vessel pairs is contacted. The sampling staff will then

[5] according to written contract, the fishermen have the same responsibility regarding the sampling, as if observers would have been making decisions aboard

collect samples in the harbour where the fish is landed. In total, 4 métier sampling trips are included in the WP. The bulk of the Swedish vendace sampling programme is financed nationally.

Scheme: Baltic other (market stock specific)

Purpose: Stock-specific programmes for length, length-weight relationship, age, maturity and stock composition of commercial landings from Herring and Sprat stocks in the Baltic

Design: Multi-stage

Main end-users: ICES HAWG, ICES WGBFAS; National fisheries management agency; Scientific research projects.

Herring

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during 2017	Fishing trip x species	Quarter and Subdivision (24-29S; 29N-31)	ad-hoc selection by first hand buyer; it is requested that samples are spread out in quarter	8 to 10 Trips,
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, sex maturity, intestinal fat, nematodes ichthyophonus)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	400 individuals per Quarter and Subdivision 800 individuals per Quarter and Subdivision (29N-31)

Sprat

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during 2017	Fishing trip x species	Quarter and Subdivision (24-29S)	ad-hoc selection by first hand buyer	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer until sampling targets are attained	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, sex maturity)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available)	500 individuals per Quarter and Subdivision

				until sampling targets are achieved	

Herring/sprat landings of Danish vessels landing in Sweden

Danish vessels landing herring or sprat in Swedish ports are sampled whenever possible.

Main limitations: Lack of control of selection procedures

Expected difficulties: Weather conditions and number of boats fishing can affect sampling in Q1 and Q4

Expected coverage of target population (based on average number of samples obtained and average number of trips per strata in 2013-2015):

- SWE - Balt (stock spec) - Act - 24 – HerSpr: 20.9%
- SWE - Balt (stock spec) - Act - 25 – HerSpr: 3.4%
- SWE - Balt (stock spec)- Act - 26 – HerSpr: 7.0%
- SWE - Balt (stock spec)- Act - 27 – HerSpr: 3.1%
- SWE - Balt (stock spec)- Act - 28 – HerSpr: 4.2%
- SWE - Balt (stock spec)- Act - 29 – HerSpr: <0.1%

Data archiving: Secure SQL database and RDB

Quality assurance: Data entry checks and database internal validation, quarterly and annual checks using R-scripted routines and developments from FishPI WP4

Age reading: Otoliths are aged according to ICES guidelines.

Quality: No bias has been identified so far; Data are routinely used by end-users

Future improvements: The scheme will be peer-reviewed by independent external experts in Nov/2016. A workplan for optimization and better approximating statistical sound sampling and estimation and end-user needs will be put in place. Implementation of a new design is expected for 2018 onwards.

Scheme: logbooks & journals, freshwater

Purpose: biological sampling for weight, length, sex, maturity, age and endoparasite (*Anguillicola crassus*) from the commercial freshwater eel fishery.

In addition to the biological sampling the official fishery statistics of landings (numbers and total weight) of all commercial freshwater eel fisheries is collected by Swedish Agency for Marine and Water Management (SwAM) from all licensed fishermen. Numbers and weight of caught eel are used in ICES stock assessment models.

Design: Multi-stage

Main stratification: 1 Strata (see details in Table 4A)

Temporal Stratification: annual

Spatial Stratification: none

Strata: Freshwater, Eel-Fresh

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Commercial eel fishery	fisherman X lake	NA	Representative eel fisherman in three lakes	1 fisherman X lake
2SU	Landings	Individual fish	1 cm length classes	Random sample	125 fish per lake (375 fish in total) are sampled for weight, length, sex, maturity, age and endoparasite *A. crassus.*

Main limitations: The mandatory statistics data are the catch and the corresponding effort, however with different resolution and aggregation depending on the lakes concerned. EU logbooks are not used in freshwater but various journals depending on lake. A part of the "recreational" catch is reported, but only if commercially sold. Eel rescued from mortalities in hydropower installation through a Trap and Transport program are reported to SwAM by the fishers organization on behalf of the industry.

Individual size, stage, sex, age and prevalence of an endoparasite (*Anguillicola crassus*), are collected from eels sampled from the commercial fishery in freshwater as described in Table 1C.

Expected difficulties: Unreporting or misreporting of catches occurs to an unknown extent. Since journal reliability is dependent on correct reporting by fishermen, there is potential bias in data.

Data archiving and quality assurance: Data archiving and quality assurance procedures for catch data are performed by the responsible authority, Swedish Agency for Marine and Water Management (SwAM). For data on biological variables archiving and quality assurance procedures are performed by SLU Aqua (Table 5A).

Quality: Data are routinely used by end-users (mainly ICES and SwAM).

By altering sampling between different lakes, fishermen and year, most "eel lakes" will be covered within a number of years concerning sampling of biological variables. Expected coverage of the commercial fishery statistics of target population by lake is close to 100% (based on the mandatory fishing journals conducted by licensed fishermen, meaning that all catch and/or landings have to be reported).

Future improvements: Reporting of effort should be mandatory. The reliability of the journal data could be improved by reducing unreported and misreported catches. SwAM is continuously working on improving data reliability.

NORTH SEA AND EASTERN ARCTIC

Scheme: Skagerrak/Kattegat at-sea

Purpose: Length, age, weight data of landings and discards of demersal species in Skagerrak (subdiv 20) and Kattegat (subdiv 21)

Main end-users: ICES WGBFAS, ICES WGNSSK, NAFO/ICES NIPAG; National fisheries management agency; scientific research projects

Design: Multi-stage

Main stratification: 7 fishery strata (see details in Table 4A)

Temporal and Spatial Stratification: Quarterly (all fisheries); Subdiv (in some fisheries, see table 4A-B)

Per strata

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	List of vessels active in the fishery during 2016	Vessel	Quarterly	random draw from vessel list with unequal probability (probability proportional to number of trips; draw with replacement)	3 (per quarter)
2SU	Hypothetical list of trips from vessel	Fishing Trip	---	ad-hoc (dependent on staff availability)	1 (per vessel)
3SU	Hypothetical list of hauls in trip	Haul	---	Census	Census
4SU	Hypothetical list of individuals caught in haul	Individuals	Species x Catch Fraction x Commercial Size Category (*) Biology: also 1cm length classes	Length: Census (random sample if too large) Biology: Census (random sample if too large); sampling stops when trip goals are achieved	Length: all individuals Biology: WIT landings: Otoliths and individual weights from a subsample of 5-10 kg per trip COD discards: 3 otoliths and individual weights (per size class and trip) PLE discards: 3 otoliths and individual weights (per size class and trip) WIT discards: 3 otoliths and individual weights (per size class and trip)

(*) in at-sea sampling of "SWE - SkaKat (at-sea) - Act - 20/21 – PanTrawlTun" and "SWE - SkaKat (at-sea) - Act - 20/21 - PanTrawlNoTun" reference samples from unsorted shrimps catches from the last haul are collected for validation purposes

Main limitations: Sampling frames used in some strata are defined in terms of both métiers and areas; Quota sampling for ages and weights may not ensure proper spatial coverage of the most abundant size classes;

Expected difficulties: There is risk for refusals related to landing obligation and other management measures; usage of random vessel lists in some strata is statistically sound but may bring about low coverage in some subdivisions.

Expected coverage of target population (based on expected trips and 2013-2015 average number of trips per strata):

- SWE - SkaKat (at-sea) - Act - 20/21 – PanTrawlTun: 1.7%
- SWE - SkaKat (at-sea) - Act - 20/21 – PanTrawlNoTun: 0.6%

- SWE - SkaKat (at-sea) - Act - 20 – NepTrawlGrid: 0.3%
- SWE - SkaKat (at-sea) - Act - 21 – NepTrawlGrid: 0.7%
- SWE - SkaKat (at-sea) - Act - 20 – MixTrawl: 0.9%
- SWE - SkaKat (at-sea) - Act - 21 – MixTrawl: 1.2%
- SWE - SkaKat (at-sea) - Pass - 20/21 – NepPots: 0.2%

Scheme: Skagerrak/Kattegat other (market stock specific)

Purpose: Stock-specific programmes for length, length-weight relationship, age, maturity and stock composition of commercial landings from Herring, Sprat and Cod stocks in the Skagerrak and Kattegat

Main end-users: ICES HAWG, ICES WGBFAS, ICES WGNSSK, NAFO/ICES NIPAG; national fisheries management agency; scientific research projects;

Design: Multi-stage

Cod

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of cod from target subdivision during 2017	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer until sampling targets are achieved. It is requested that trips are spread in time.	Variable
2SU	List of size categories of cod in fishing trip	Size category	---	ad-hoc selection by first hand buyer until sampling targets are achieved. It is requested that size categories are spread across trips (i.e., only 1-2 size categories are sampled per trip)	1 size category
2SU	List of boxes in size category	Box	---	ad-hoc selection by first hand buyer until sampling targets are achieved	1 box (size 1 to 4) ½ to 1 box (size 5)
3SU	Cod individuals in box	Biology of individuals (individual length, weight and age)	---	ad-hoc selection by first hand buyer until sampling targets are achieved	All fish are sampled for weight and otoliths until the following quarter*subdiv targets are achieved: Size 1: 50 indiv. Size 2: 50 indiv. Size 3: 100 indiv. Size 4: 100 indiv. Size 5: 100 indiv.

Herring

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from target subdivision during 2017	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, maturity, nematodes)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	650 individuals per Quarter and Subdivision

Sprat

	Sampling frame	Sampling unit	Stratification	Selection Method	Sampling effort
1SU	Hypothetical list of fishing trips with landings of herring or sprat from subdivision during 2017	Fishing trip x species	Quarter and Subdivision (20, 21)	ad-hoc selection by first hand buyer until sampling targets are achieved	Variable
2SU	Individuals landed on fishing trip	Box	---	ad-hoc selection by first hand buyer until sampling targets are achieved	1 Box
3SU	Herring individuals in box	Biology of individuals (individual length, weight, age, maturity)	---	Census or subsamples (50-150 per box when boxes are large and many boxes are available) until sampling targets are achieved	400 individuals per Quarter and Subdivision

Danish landings of Pandalus shrimps

Danish vessels landing *Pandalus borealis* in Swedish ports are sampled whenever possible.

Main limitations: Lack of control over selection procedures

Expected difficulties: None (assuming first hand buyers continue to cooperate and significant landings take place)

Expected coverage of target population (based on average number of samples obtained and average number of trips per strata in 2013-2015):

- SWE - SkaKat (stock spec)- Act - 20 – HerSpr: 33.8%
- SWE - SkaKat (stock spec)- Act - 21 – HerSpr: 29.4%

- SWE - SkaKat (stock spec)- Act - 20 – Cod: 5.3%
- SWE - SkaKat (stock spec)- Act - 21 – Cod: 9.8%

All Schemes:

Data archiving: Secure SQL database and RDB

Quality assurance: Data entry checks and database internal validation, quarterly and annual checks using R-scripted routines and developments from FishPI WP4

Age reading: Otoliths are aged according to ICES guidelines.

Quality: No bias has been identified so far; Data are routinely used by end-users

Future improvements: The scheme will be peer-reviewed by independent external experts in Nov/2016. A work plan for optimization and better approximating statistical sound sampling and estimation and end-user needs will be put in place. Implementation of a new design is expected for 2018 onwards.

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

Note: during the elaboration of this Annual Report an error was noticed on the number of PSU samples displayed in the text of *Scheme: Baltic "at-sea or self-sampling*. The error resulted from a confusion between quarterly and annual goals (Errata):

		Where it reads	...	**Should be read**
	Sampling frame	Sampling effort	...	Sampling effort
1SU	List of weeks of the year	Gillnets: 8 (per quarter) Longlines: 6 (per quarter)	...	Gillnets: 4 (per quarter) Longlines: 3 (per quarter)
2SU	List of vessels active in the gillnetter or longlines fisheries for demersal species in specific subdivisions during 2016	2 (per week)	...	1 (per week)

Scheme: Baltic at-sea: No major deviations in the overall sampling plan; Sampling effort in *Stratum: SWE - Balt (at-sea) - Act - 24/25 – DemTrawl* was lower than originally planned because of closures in fishery, changes to quota and reduced activity in vessels (see details and explanation in Table 4A)

Scheme: Baltic self-sampling: No major deviations in the overall sampling plan; Slight under-sampling due to bad weather (see Table 4A). The under-sampling did not significantly affect end-usage.

Scheme: Baltic "at-sea or self-sampling": No major deviations in the sampling plan <u>except</u> for three situation. Significant logistic difficulties were experienced in the implementation of sampling in *Stratum: SWE - Balt (at-sea/self) - Pass - 27/29 – DemNets* with no samples collected from this strata. Lower number of samples than planned were collected from Strata *SWE - Balt (at-sea/self) - Pass - 24 – DemLonglines* and *SWE - Balt (at-sea/self) - Pass - 25 – DemLonglines* due to limited fishery. These deviations did not significantly affect end-users because, e.g., landings of cod from nets in 27/29 were <2% of national landings from cod.27.25-32; Longlines in 24/25 are <5% of landings of the cod in these two areas.

Scheme: Baltic at-sea 2: with regards to *Anguilla anguilla*, Baltic Sea, EIFAAC/ICES/GFCM IIIb-d, Length, Survey (Stratum *KBWE2*): Planned maximum effort in this fyke net survey was carried out. The low % of achievement was due to that the catches of eel were lower than expected. Besides these 344 yellow eel, 6 silver eel were also sampled according to change in sampling scheme. When WP is updated, the addition of biological sampling of both stages of the species will be included.

Scheme: Baltic onshore sampling: No significant deviations in the overall sampling plan. Deviations did not affect end-usage.

Scheme: Baltic other (market stock specific): No significant deviations in the overall sampling plan. Deviations did not affect end-usage.

Scheme: logbooks & journals, freshwater: No significant deviations in the overall sampling plan. Deviations did not affect end-usage

NORTH SEA AND EASTERN ARCTIC

Note: during the elaboration of this Annual Report an error was noticed – NAFO/ICES NIPAG is not an end user of data collected under **Scheme: Skagerrak/Kattegat other (market stock specific).**

Scheme: Skagerrak/Kattegat at-sea: some (generally minor) deviations in achieved sampling goals due to e.g., bad weather or changes in the behaviour of the vessels (see comments in table 4A). Such deviations did not significantly affect end-usage.

Scheme: Skagerrak/Kattegat other (market stock specific): No significant deviations in the overall sampling plan. Deviations did not affect end-usage.

3. Action to avoid deviations

BALTIC SEA

Scheme: Baltic at-sea: To account for reductions in fleet activity the sampling effort per quarter was adjusted to 4. Similar to last year this effort may be adjusted if there are additional changes in the fishery.

Scheme: Baltic self-sampling: NA

Scheme: Baltic "at-sea or self-sampling": The self-sampling component will receive increasing emphasis in 2018 as a means to tackle difficulties in sampling *Stratum: SWE - Balt (at-sea/self) - Pass - 27/29 – DemNets* and Strata *SWE - Balt (at-sea/self) - Pass - 24 –* DemLonglines and *SWE - Balt (at-sea/self) - Pass - 25 – DemLonglines*

Scheme: Baltic at-sea 2: NA

Scheme: Baltic onshore sampling: NA

Scheme: Baltic other (market stock specific): NA

Scheme: logbooks & journals, freshwater: NA

NORTH SEA AND EASTERN ARCTIC

Scheme: Skagerrak/Kattegat at-sea: NA

Scheme: Skagerrak/Kattegat other (market stock specific): NA

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

Data quality in all steps of the data collection has been under development for a number of years, in many international fora. The latest to mention would be; PGDATA, WGCATCH, WGBIOP, Standards, procedures and quality control in sampling are also under constant development on a national level. Comprehensive quality control work is in place for most sampling schemes and work is ongoing during 2017-2018 to document these designs and processes. The aim is to compile, coordinate and make the protocols available in a structured and accessible through a public website. During 2018-2019, when more guidance is expected to be available from expert groups, also documentation of estimation methods and other aspects of data processing will continue.

Specific actions taken to improve the quality assurance framework during 2017 and 2018 in Sweden are following:

1. Sweden play an active role in the RDB-SC (co –chairing the group) and is contributing heavily in the RDBES core team group. The RDBES will have huge impact on the development for MS to move towards statistical sound sampling, increase transparency in estimation of input values for stock assessment and therefore improve the overall data quality.
2. Sweden has developed a number of r-scrips during 2017 and 2018 for screening the national data for errors. The scripts are systematically used for some sampling types and the plan is to implement the routine for all sampling types.
3. Sweden started in 2018 a documentation project with the aim to structure the protocols already existing and make them available. The structural work has started in 2018. Sweden will also participate in the RCG intersessional group “Facilitate quality assurance of data and sampling programmes” started in 2018/19.
4. A Swedish quality project in ongoing since many years at SLU (Swedish University of Agricultural Science) in which SLU Aqua is participating. The aim is to achieve quality standards on data collection, data storage, data handling and to make data available

Information on the methodology used to assure the quality of the data collected are given in Text Box 1C and 1D.

Following was indicated as´ N´ in table 5A

2. Sampling design

Salmon; River sampling, counts of ascending individuals salmon and *Recreational river catches survey*: Main constraints are that no single survey type exists for all rivers. The current sampling schemes has been documented within the SLU quality guide program and potential weaknesses in data management and documentation has been identified. Workshops for sampling design and estimates have been held during 2017.

Silver eel escapement, designated rivers; Silver eel escapement will be monitored in one to two rivers using fixed traps at weirs in combination with fish counters. Tagging/tracking will be done to verify the results. This approach and design is in line with similar studies in other member states in EU as discussed within ICES WGEEL

3. Sampling implementation

Skagerrak/Kattegat other, Baltic other; see general description of plan for development, section 1 Textbox 5A.

Salmon; *Recreational river catches survey*: Main constraint is that most rivers report catches are estimated from voluntary reports. It is not legal to keep recreational fishermen registered in Sweden. Hence the reporting of catches has to continue on voluntary basis.

Silver eel escapement, designated rivers; Actual sampling is not yet implemented as the first river with all installations and arrangements required will be started up during 2018

4. Data capture

Salmon; River sampling, counts of ascending individuals salmon and *Recreational river catches survey*: Quality checks to validate detailed data are currently not documented but routines for this are under development. The current sampling schemes has been documented and potential weaknesses in data management and documentation has been identified.

Silver eel escapement, designated rivers; As the use of designated rivers also for the assessment of silver eel escapement is a new concept to us, no traps are yet running and therefore no data has been captured so far.

5. Data Storage

Salmon: River sampling, counts of ascending individuals salmon, Recreational river catches survey and *River sampling, salmon smolt counts*:

Data is currently not stored in any database but work with national database is in progress. No international database exist but data is delivered to WGBAST.

River sampling, salmon parr counts: No international database exist but the national database is publically available and data is delivered to WGBAST.

Recreational fisheries- postal questionnaire: this survey is managed by SwAM and stored in their data warehouse and data is also delivered to WGBAST.

6. Data processing

Skagerrak/Kattegat at sea; Skagerrak/Kattegat other, Baltic at-sea, Baltic self-sampling, Baltic at-sea or self-sampling, Baltic other: see general description of plan for development, section 1 Textbox 5A.

Salmon

The processes to evaluate data accuracy for *River sampling, counts of ascending individuals salmon, Recreational river catches survey* and *River sampling, salmon smolt counts, River sampling, salmon parr counts* and *Data collection of stocked amounts and sites* are not currently documented but work is in progress within the SLU quality guide program. The estimation methods are currently not documented for *River sampling, counts of ascending individuals salmon, Recreational river catches survey, River sampling, salmon smolt counts, River sampling, salmon parr counts, Data collection of stocked amounts and sites, Fishermen logbooks, coastal (diadromous) and fishermen catch reports, rivers (diadromous)* but work is in progress within the SLU quality guide program.

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.

1. Evidence of data quality assurance

Fishing fleet

There were no changes during the sampling year, regarding all data collection schemes for the fishing fleet. The methodology used to assure the quality of the data is divided in sections, from initial data collection to final product for the end user. Data is checked in the initial stage on a daily and monthly basis depending on the form of the data (logbook or journal). Checks are performed automatically and manually within the control unit at SWaM. In the intermediate process where data is aggregated and compiled, a second data check is carried out with a time-series perspective, finding anomalies over time. Questionnaire data are cross-checked with transversal data for plausibility reasons. Data is checked when finalized, both with internal data assurance tools but also via DV-tool provided by (JRC/STECF). Furthermore, data issues are cross-checked by another MS at the first session writing Annual Economic Report. All data checks are performed with statistical programs such as Excel and Stata (hard checks) but also more soft checks done by an expert. No N is indicated in table 5B.

Aquaculture

Data is collected, estimated and checked by Statistics Sweden which ensures the consistency and quality of final data. For Q1 data checks are done according to check lists following agreed routines for quality assurance within Statistics Sweden. Corresponding checks are done for Q2, by Statistics Sweden and Swedish Board of Agriculture in cooperation. No N is indicated in table 5B.

Fish processing

All data is collected, estimated and checked by Statistics Sweden which ensures the consistency of the final data. The data quality evaluation is carried out by Statistics Sweden before delivering it to the Board of Agriculture, who conducts a macro evaluation upon delivery to ensure no abnormal or implausible changes have occurred by comparing the new data with previous years. No N is indicated in table 5B.

2. Section P3 Impartiality and objectiveness

No N is indicated in table 5B.

3. Section P4 Confidentiality

No N is indicated in table 5B.

4. Section P5 Sound methodology

See text box 3A for further details.

5. Section P6 Appropriate statistical procedures

https://www.havochvatten.se/

6. Section P7 Non-excessive burden on respondents

No N is indicated in table 5B.

7. Section P8 Cost effectiveness

No N is indicated in table 5B.

8. Section P9 Relevance

No N is indicated in table 5B.

9. Section P10 Accuracy and reliability

See text box 3A for further details.

10. Section P11 Timeliness and punctuality

No N is indicated in table 5B.

11. Section P12 coherence and comparability

No N is indicated in table 5B.

12. Section P13 Accessibility and Clarity

See text box 3A for further details.