Cruise report

RV "DANA" - Cruise 05/2020

Herring Acoustic Survey in the North Sea, Kattegat and Skagerrak (HERAS)

22 June – 9 July 2020

Susan Mærsk Lusseau, Section for Monitoring and Data
DTU-Aqua, National Institute of Aquatic Resources

Cruise summary

Total days	17
Days of monitoring	14
Number of nautical miles monitored	2 484 + 152 miles for calibration
Number of trawl hauls	42
Number of CTD stations	38
Number of WP2 plankton stations	26
Fish catch in kg	19 692
Number of measured herring	16 512
Number of measured mackerel	5 236
Number of measured sprat	4 899
Number of species measured	57
Total number of measured fish	38 214
Number of herring frozen for age and stock-split	3 091
Number of sprat frozen for age	1 543

1 Background

This cruise is part of an international hydro acoustic survey for herring and sprat (HERAS) coordinated by the ICES Working Group of International Pelagic Surveys (WGIPS). The survey is carried out annually by national fisheries institutes from Scotland, Germany, Netherlands, Norway, Ireland and Denmark in the last week of June and the first 2 weeks of July. Geographically it covers most of the continental shelf north of 52°N in the North Sea and to the west of Scotland and Ireland to a northern limit of 62°N. The eastern edge of the survey area is bounded by the Norwegian, Danish, Swedish and German coastline and to the west by the shelf edge at around 200 m depth.
The DTU National Institute of Aquatic Resources (DTU AQUA) has participated in the herring acoustic survey of the North Sea and adjacent waters with the responsibility for surveying the Skagerrak and Kattegat area since 1991. The 2020 cruise with R/V DANA, was conducted in the period June 25 June to July 9 2020, while calibration was done during June 22 to June 25 2020.

2 Objectives

The objective of the survey is to provide age aggregated abundance and biomass estimates as well as maturity levels and weight at age for the herring and sprat stocks covered by the survey. These indices are used in the assessments of sprat and herring stocks carried out in the ICES Herring Assessment Working Group (HAWG) and underpin the management of North Sea herring, Western Baltic Spring Spawning herring, Malin Shelf herring as well as sprat in the North Sea and Skagerrak.
In addition to hydro-acoustic estimates of sprat and herring abundance, the survey also collects information on hydrography and plankton abundance in the survey area to facilitate studies into drivers of herring and sprat abundance and distribution.
In 2020 there was additional time allocated to the EASIMACK project to investigate at which point in the catching process mackerel caught in a bottom trawl in this area enters the net.

The following specific objectives where planned for cruise 05/2020 on Dana:

- Collect continuous hydro-acoustic measurements along pre-defined transects
- Carry out trawl sampling with bottom and pelagic trawls to verify species and size composition of acoustic registrations
- Collect biological samples of herring and sprat for further analysis of age, stock and maturity composition as well as individual lengths and weights
- Carry out hydrographic sampling along transects (Thermo-Salinograph measurements) and associated with fishing stations (CTD casts) for pelagic habitat description
- Collect plankton samples for water-column integrated dry weight estimates for pelagic habitat description
- Deploy cameras during bottom trawling to explore if mackerel found in the catches are caught close to the seabed or in the surface layers during setting and hauling of the trawl.

3 Survey Description and Methods

3.1 Survey participants

During calibration 22/6– 25/6 2020

Name	Section	Function
Susan Mærsk Lusseau	DTU Aqua, Monitoring Hirtshals	Cruise leader
Karl-Johan Stæhr	External consultant	Acoustics
Torben Filt Jensen	DTU Aqua, Monitoring Hirtshals	Acoustics
Ronny Sørensen	DTU Aqua, Monitoring Hirtshals	Technician
Christian Petersen	DTU Aqua, Monitoring Hirtshals	Technician

During acoustic monitoring 25/6 - 9/7-2020

Name	Section	Function
Susan Mærsk Lusseau	DTU Aqua, Monitoring Hirtshals	Cruise leader
Torben Filt Jensen	DTU Aqua, Monitoring Hirtshals	Acoustics
Annegrete D. Hansen	DTU Aqua, Monitoring Hirtshals	Acoustics, CTD
Ronny Sørensen	DTU Aqua, Monitoring Hirtshals	Technician, CTD
Helle Rasmussen	DTU Aqua, Monitoring Hirtshals	Fish lab, WP2
Thomas Møller	DTU Aqua, Monitoring Lyngby	Fish lab, WP2
Jesper Knudsen	DTU Aqua, Monitoring Hirtshals	Fish lab, WP2
Jan Werner Thomsen	DTU Aqua, Monitoring Hirtshals	Fish lab, WP2
Fletcher Thompson	DTU Aqua, Monitoring Lyngby	EASIMACK project

3.2 Cruise Narrative

The survey on R/V Dana started on June 22nd at 19:05 UTC with departure from Hirtshals heading for Bornö in Gullmar Fjord, Sweden for calibration of the acoustic equipment. The vessel was anchored at Bornö in the Gullmar Fjord, Sweden June 23rd at 08.25 UTC. The calibration was initiated in the afternoon of June 23rd and continued until the morning of June 25th. On June 25th at 05.05 UTC Dana left Bornö to arrive in Hirtshals June 25th at 12.00 UTC for exchange of the scientific crew.

Dana left Hirtshals at 15.02 UTC to steam northwest towards the Norwegian coast west of the border between Skagerrak and the North Sea. Monitoring data collection was started on June 26 at 58° 11'N, 6° 15'E at 00.20 UTC with a CTD cast and a trawl haul.

The North Sea was covered during the period June 26 – June 30. A small 20 nautical mile stretch of transect along the Danish west coast was cancelled to avoid being caught out in severe

weather forecasted later in the week. The outer Skagerrak was covered during June 30 - July 3. The monitoring work was paused at 03.00 on July 3rd and passage was made to an area east of Skagen where four trawls were made for the EASIMACK project. Prior to starting EASIMACK trawling, a member of crew disembarked in Skagen due to illness. Monitoring work resumed at 22.30 on July 3rd to cover inner Skagerrak (Strata 31) starting on the northern most transect. Due to rapidly deteriorating weather with forecast of heavy swell up to 6 meters it was decided to postpone the two last transects in the south of strata 31. Passage was therefore made at 09:31 on July 5th to the first transect in strata 21 where it was hoped shelter from land would improve working conditions.
Strata 21, which covers Kattegat, was completed between 14:08 on 5th July and 00.20 on 8th July. Due to continued strong winds and heavy swell the order of transects was re-arranged half way through strata 21 in the hope that transects in the southern Kattegat were less exposed and the three most southern transects were completed from South to North.
With much improved weather it was possible to also complete the postponed transects in the south of strata 31 starting on 8th July 17.55.

The acoustic integration was ended July 9 at 57° 38'N, 011° 16'E at 02.06 UTC and Dana arrived back in Hirtshals at 09.20 UTC on July 9 2020.

3.3 Calibration

The echosounders were calibrated at Bornö in the Gullmar Fjord, Sweden, between June 22 - June 25 2020. The calibration was performed according to the procedures established for EK60 with three frequencies (18, 38 and 120 kHz). This was the second calibration of the year, the previous one just before a cruise to the Norwegian Sea in April. The calibration of the towed body split-beam transducer at 38 kHz as well as the two hull-mounted split-beam transducers at 38 and 120 kHz were carried out against a 38.1 mm tungsten sphere. The calibration of the final hull-mounted split-beam transducer at 18 kHz was carried out against a 63mm copper sphere. The results were close to those from the previous calibration earlier in April, and for 38 kHz on the towed body close to results from previous years. A second calibration of the 38 Khz transducer on the towed body was also carried out against a 60mm copper sphere. This is the transducer that is used for integration for abundance estimation. The calibration and setup data of the EK60 38 kHz used during the survey are shown in Table 1.

3.4 Survey design

The survey was carried out in the Kattegat and Skagerrak area, east of 6° E and north of 56° N. The area is split into 6 analysis strata (Fig. 1).

The survey is designed with parallel survey tracks perpendicular to bathymetric lines as far as possible with a spacing of 15 nm in strata 151 and 152, 17.5 nm in strata 41 and 42 and 10 nm in strata 31 and 21.

The planned transects to be covered by Dana is shown in Figure 1 and is agreed with the other participating nations.

3.5 **Acoustic data collection and processing**

Hydro acoustic data were recorded 24 hours a day using the Simrad EK60 echosounder with a 38 kHz transducer mounted in a towed paravane running at depths of 4 – 6 m depending on the sea state and sailing direction relative to the waves, at a standard ship speed of 9 - 11 kn. Simultaneously, data from the 120 kHz and 18 kHz hull-mounted transducers were also recorded throughout the survey. During trawling operations the paravane was secured on deck and data was recorded from hull-mounted transducers for all three frequencies. The 18 kHz and 120 kHz data are not directly used for the survey estimate, but as an aid during scrutiny when distinguishing between fish and plankton and only the data collected with the 38kHz transducer in the paravane are used in the abundance estimation process. The acoustic data were recorded as .RAW data onto hard disk 24 hours a day also during fishing operations.

3.6 **Biological Data - Trawl Hauls**

Trawl hauls were carried out during the survey for species identification. Pelagic hauls were carried out using a FOTÖ trawl (16 mm in the codend), while demersal hauls were carried out using an EXPO trawl (16 mm in the codend). Trawling was carried out in the time intervals 1000 to 1600 and 2030 to 0300 UTC, usually two day hauls (pelagic on larger depth and demersal in shallow waters) and two night hauls (mostly surface or midwater). The strategy was to cover most depth zones within each geographical stratum with trawl hauls. One-hour hauls were used as a standard during the survey, although this was shortened if large aggregations were present to avoid gear damage.

The total weight of the catch was estimated and the catch sorted into species. Total weight per species and length measurements of each species were taken. The clupeid fish were measured to the nearest 0.5 cm total length below, other fish to 1 cm, and the weight to the nearest 0.1g wet weight. From each trawl haul 6 herring (if available) per 0.5 cm length class were collected and frozen for individual determination in land-laboratory of length, weight, age, stock (North Sea autumn spawners or Baltic Sea spring spawners) and maturity. Fourier Shape Analyses calibrated to micro-structure formed in the otoliths during the larval period was used for the discrimination of herring stocks. Maturity was determined according to an 8-stage scale as also used by Scotland.

3.7 **Zooplankton**

During the survey WP2 samples were taken once in late evening and once at noon. Sampling was conducted from 150 m or 5 m above bottom to surface with a 180 µm netting. The samples were fractioned in size groups by filters of 2000 µm, 1000 µm and 180 µm and dried for 24 hours and frozen for dry weight measurements at shore.

3.8 **Hydrography**

CTD profiles with a Seabird 911 were made immediately before or after each trawl haul. Salinity and temperature were also measured continuously during the cruise at an intake at about 5 m depth. Data is stored together with position and weather data in the vessel's general information system and is uploaded to ICES hydrographical data base once quality assurance procedures have been completed.

3.9 **Data analysis**

The survey acoustic data were processed in Echoview (Echoview Software Pty Ltd, 2019) to prepare the echograms for further scrutinization and analysis. This included removing interference from surface turbulence, bottom structures and scattering layers from the echogram as well as removing the sections such as trawling and passage between transects (inter-transects) not used in the abundance estimate.
For the purpose of the scrutiny process, raw data was pre-integrated into 1 m samples for each ping and stored in separate files, one for each nautical mile.
Scrutiny of the acoustic data was carried out in the DTU Aqua software, EV2AKUBIO, where thresholding is used to separate out fish echoes from background noise and plankton etc. Scrutiny of the acoustic data is done for a fixed set of layers (3-6 m, 6- 10, 10 – 20 and so on) for each mile. The software enables exclusion of data from layers and/or intervals with interference from wave- or ship wake-bubbles or rarely with interference from bottom-integration. In areas with heavy abundance of jellyfish or zooplankton, usually krill, manually adjustable thresholds are applied separately to each layer to suppress background echoes. Mean volume back scattering values (Sv) deemed to be from fish were integrated for intervals of 1 nautical mile, from 3 m below the transducer to 1 m above the bottom or to max 500 m depth. The resulting Nautical Area Scattering Coefficient (NASC) values attributed to fish were exported and uploaded to the ICES Acoustic Trawl database (http://www.ices.dk/data/data-portals/Pages/acoustic.aspx).

Further analysis was carried out in the StoX acoustic survey analysis software package (Johnsen et al 2019).
To further disaggregate the acoustic densities to single species the mean backscattering cross section was estimated for herring, sprat, gadoids and mackerel for each subarea (21, 31, 41, 42, 151 and 152 in Fig.1) based on the standardized TS-relationships given in the ICES SISP 9: Manual for International Pelagic Surveys (IPS):

$$\text{Herring } TS = 20 \log L - 71.2 \text{ dB}$$
$$\text{Sprat } TS = 20 \log L - 71.2 \text{ dB}$$
$$\text{Gadoids } TS = 20 \log L - 67.5 \text{ dB}$$
$$\text{Mackerel } TS = 20 \log L - 84.9 \text{ dB}$$

where L is the total length in cm.

The number of fish per species is assumed to be in proportion to the contribution of the given species in the trawl hauls. Therefore, the relative density of a given species is estimated by subarea using the species composition in the trawl hauls. The nearest trawl hauls are allocated to subareas with uniform depth strata.

The biological composition of the herring and sprat abundance (stock specific numbers and biomass at age and maturity as well as mean weight at age) were calculated in StoX based on the age, stock id and maturity analysis made on frozen samples of single fish after the cruise.

3.10 EASIMACK

As part of the Enhance and Advance Survey Indices for Mackerel in the North Sea project (EASIMACK), 24 hours of ship time were allotted to investigate the depth at which Atlantic mackerel (*Scomber scombrus*) enter the net during demersal trawling. Mackerel regularly appear in small numbers in bottom trawl hauls, and the purpose of this investigation is to identify if mackerel enter the net during the lowering or raising phases of the demersal trawl rather than the period the trawl is fishing along the bottom. The data collection phase of the investigation was done aboard R/V Dana by attaching cameras and dive lights to the demersal trawl gear and acquiring video of the entire trawl (from shoot to haul).
R/V Dana was equipped with the EXPO demersal trawl net, and was scheduled for trawl stations once or twice during daytime each day. Three GoPro Hero 7 cameras with waterproof enclosures, as well as diving lights were used for the task. Due to the scheduling of the trawls and the battery limitations of the GoPros, only two cameras were attached to the trawl gear at a time, with one camera withheld as a fresh substitute for the second trawl. During the course of the cruise, the placement of the cameras and lights were changed to different positions of the net, but always mounted on the topside of the net close to the headline.

4 Results

4.1 Acoustic data collection

The survey covered about 2484 nautical miles resulting in 1105 nautical miles of integrated transect track for use in stock size calculation (Figure 1).

4.2 Biological Data - Trawl Hauls

During the 2020 survey 42 trawl hauls were conducted, 20 pelagic hauls mainly in the surface and 22 demersal hauls.
The geographical distribution of hauls and details on the hauls are in Figure 2 and Table 2. Catches by species are in Table 3. Length distributions of herring, mackerel and sprat by haul are given in tables 4 to 6. Maps with herring and sprat catches in are in Figure 5 and 6.

The total catch for the survey was 19.7 tons. Herring was present in 37 hauls with a total catch of 4.4 tons or 22.1 % of the total catch. Totally 16 512 herring were measured and 3 091 frozen for age and stock splitting analysis back on land. Length distributions of herring per haul are in Table 4 and a map of catches in figure 5.

Sprat were present in 26 hauls with a total catch of 4.0 tons and 20.6 % of the total catch. Totally 4 899 sprat were measured and 1 543 were frozen for age determination back in the laboratory. Length distributions of sprat per haul are given in table 5 and a map of catches in figure 6.

Mackerel were present in 32 hauls with a total catch of 2.4 ton and 12.3 % of the total catch. A total of 5 236 mackerel were measured. Ages are not provided for mackerel in this survey. Length distributions of mackerel per haul are given in table 6.

4.3 Zooplankton

A total of 26 WP2 stations were completed. Information on the stations and distribution is given in Table 7 and Figure 3. Dry weight is measured ashore for each of the three fractions 2000 µm, 1000 µm and 180 µm.

4.4 Hydrography

During the survey 38 CTD stations were completed. Information on the stations and distribution is given in Table 7 and Figure 3. Data from the CTD stations are uploaded to the ICES hydrography data base once quality control checks have been carried out.

4.5 Biomass estimates

Biomass estimates for herring (spring and autumn spawners) and sprat will be produced based on scrutiny of the acoustic integration, catch data and stock split of herring. The estimates will be finalised at the Post Cruise Meeting for the International Acoustic Survey in the North Sea, West of Scotland and Malin Shelf in Copenhagen, November 2020 and reported in the combined report to WGIPS in Belfast in January 2021.

4.6 EASIMACK

During the cruise the camera system was deployed opportunistically when hauls with the EXPO demersal trawl was carried out and optimization of the system was able to be carried out throughout the cruise. In addition, a 12h period was dedicated solely to the project, where Dana travelled to a location where mackerel has been caught in larger numbers during the IBTS surveys recently. The 4 hauls labelled EM1-4 were collected during this period exclusively for the project. In total the camera system was deployed on 17 different deployments of the EXPO demersal trawl, resulting in 15.73 hours of *valid* video data (i.e. video recording from cameras that overlaps with the descent, trawl, and ascent phases of the trawl) were gathered. Table 9

summarises the results of the trawl stations where EASIMACK cameras were attached to the net.

5 Discussion

6 References

Echoview Software Pty Ltd (2019) Echoview software, version 10. Echoview Software Pty Ltd, Hobart, Australia.

Foote, K.G., Aglen, A. and Nakken, O. (1986) Measurement of fish target strength with a split-beam echosounder. Journal of the Acoustical Society of America, 80(2): 612-621.

ICES. 2015. Manual for International Pelagic Surveys (IPS). Series of ICES Survey Protocols SISP 9 – IPS. 92 pp.

Johnsen, E., Totland, A., Skålevik, Å., Holmin, A. J., Dingsør, G. E., Fuglebakk, E., & Handegard, N. O. (2019). StoX: An open source software for marine survey analyses. Methods in Ecology and Evolution. 10 :1523 –1528. https://doi.org/10.1111/2041-210X.13250

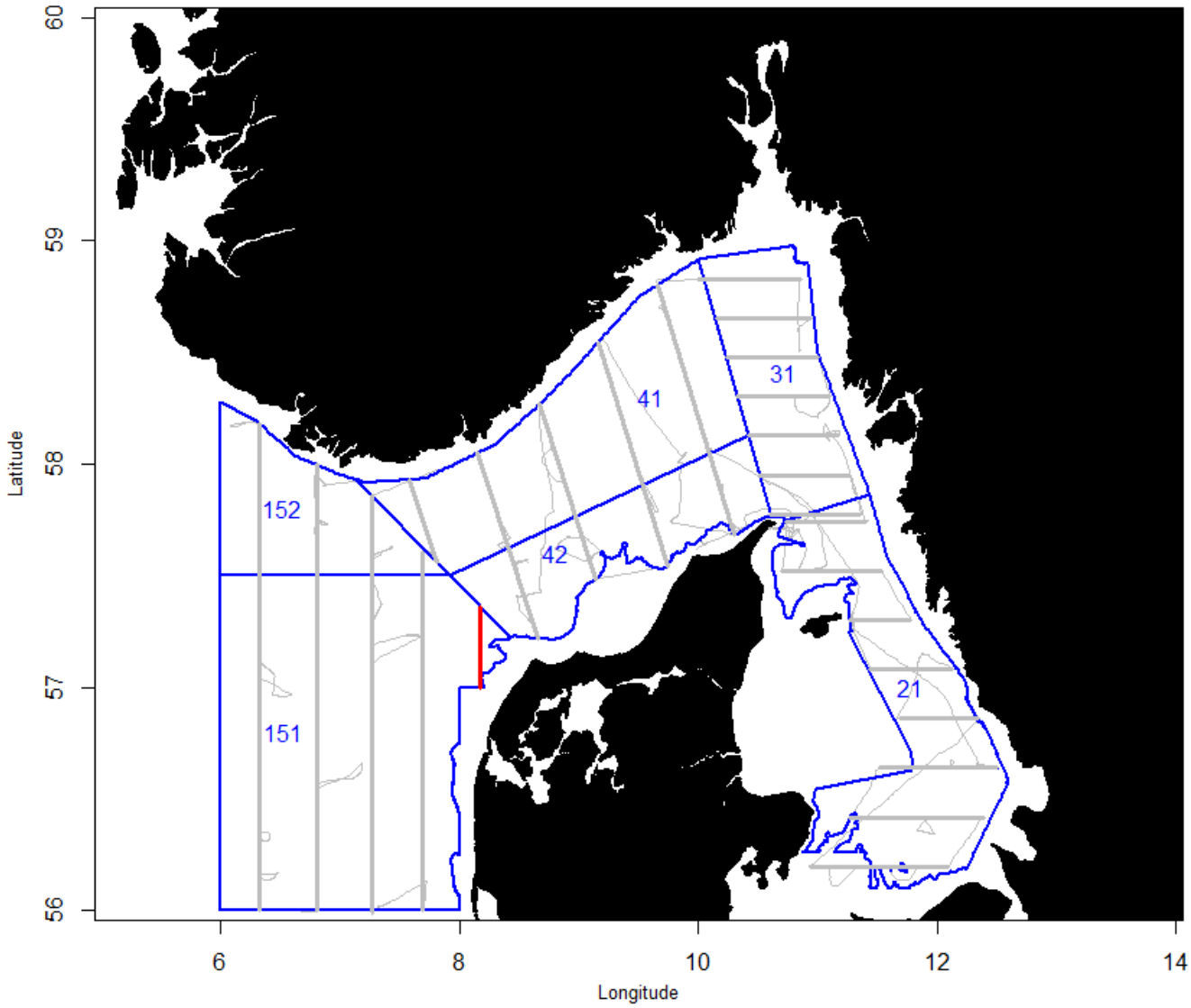

Figure 1. Survey plan for the Danish acoustic survey with R/V Dana in June-July 2020. The numbered subareas indicates the strata used in the abundance estimation, the thin grey lines the route sailed and the thick grey lines the planned transects for use in the abundance estimation. The red vertical line in strata 151 is the transect that was not covered due time constraints caused by weather.

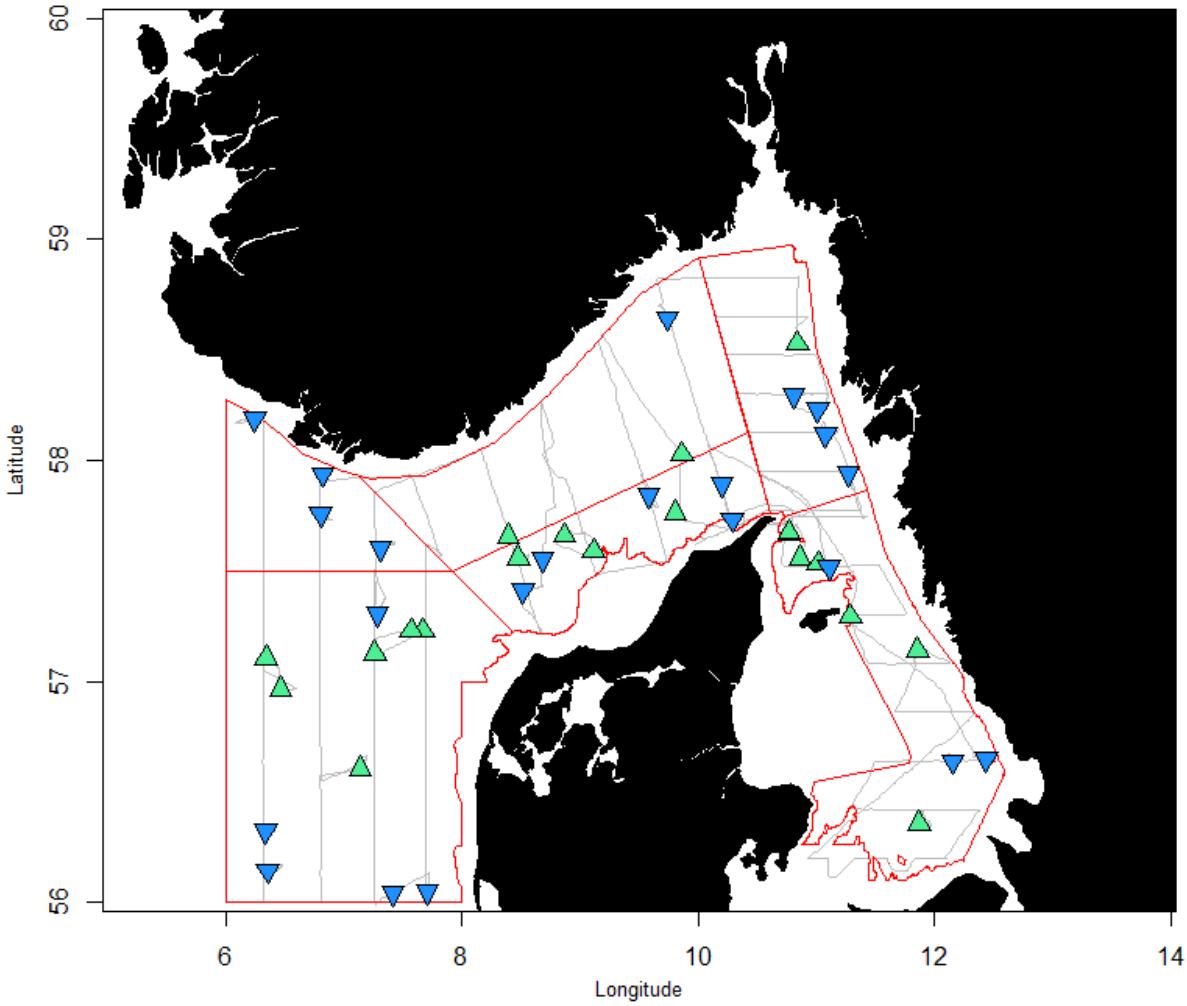

Figure 2. Vessel track and trawl stations during the Danish acoustic survey with R/V Dana in June-July 2020. Green triangles indicate locations of EXPO demersal trawl hauls and blue triangles indicate locations of Fotö pelagic trawl hauls. The pelagic hauls are almost all carried out in the surface during night time.

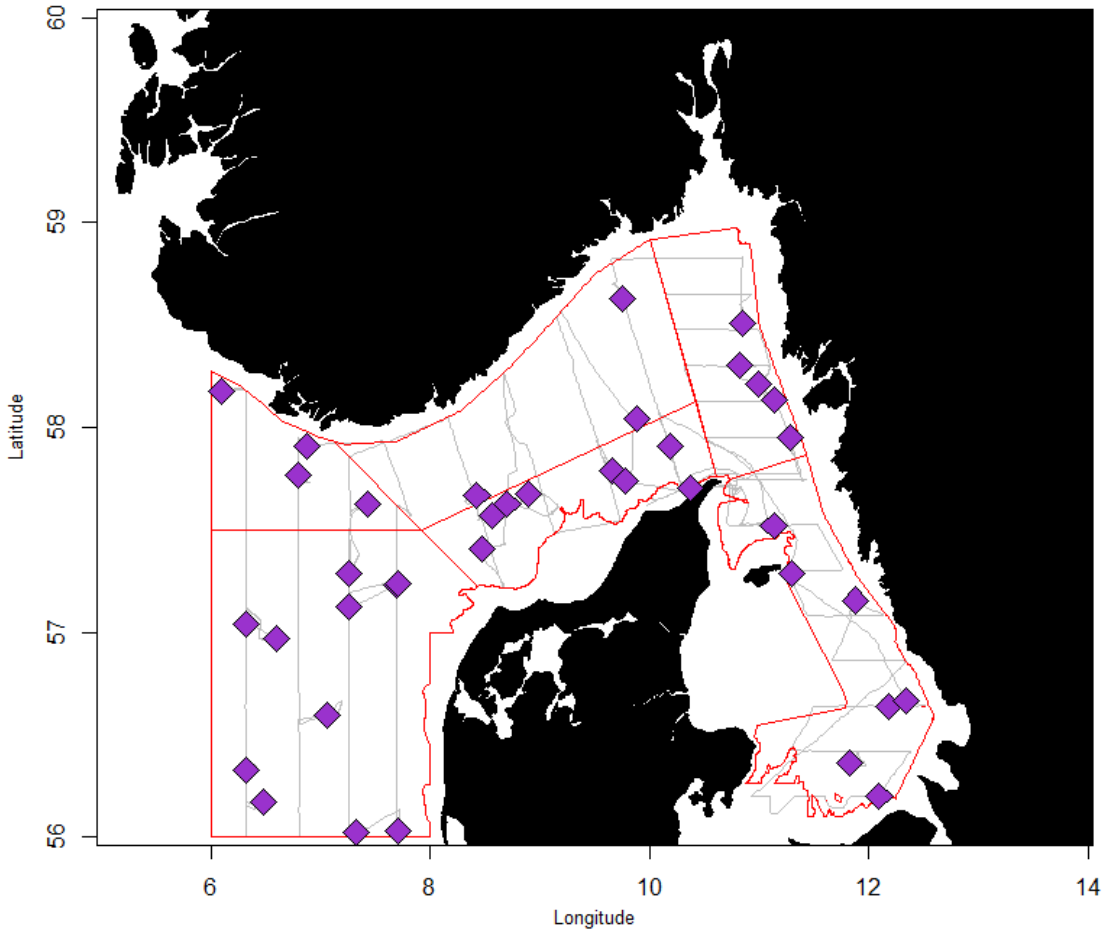

Figure 3. CTD stations during the Danish acoustic survey with R/V Dana in June-July 2020.

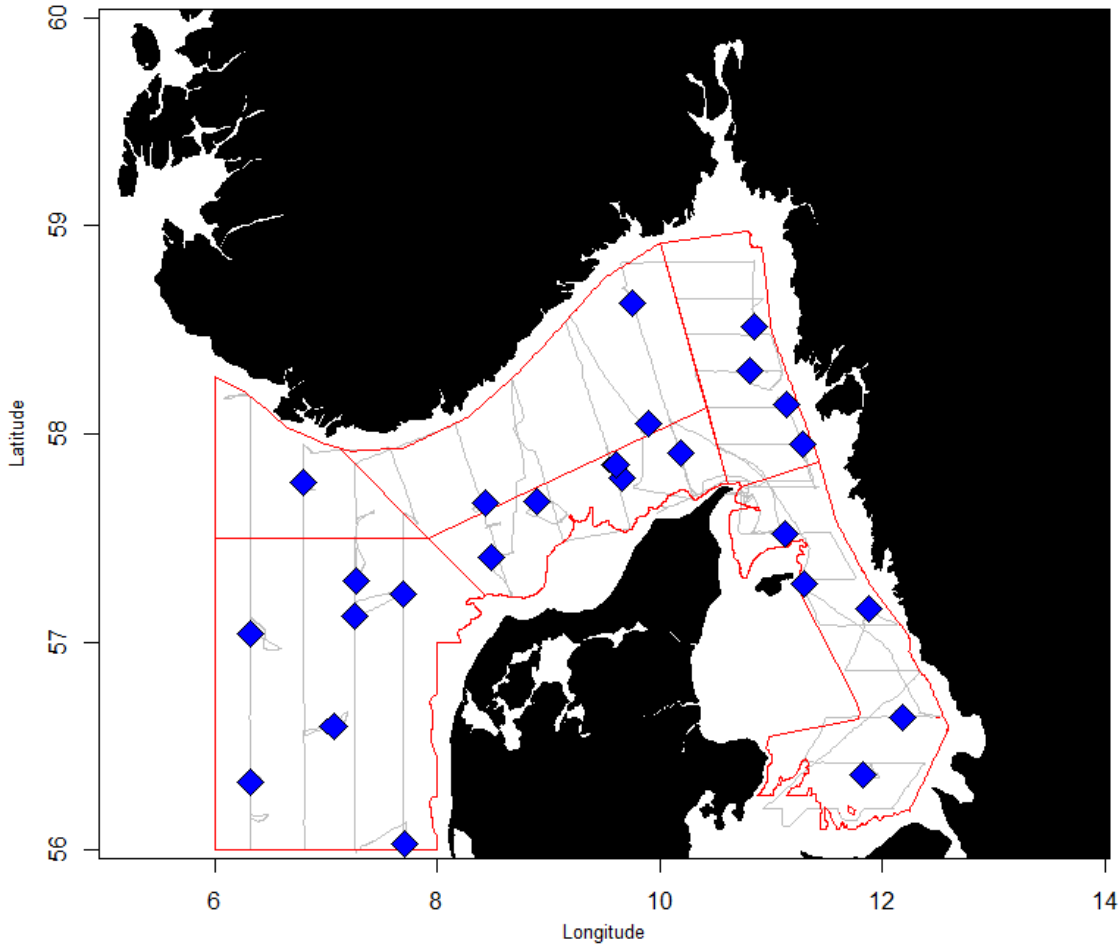

Figure 4. WP2 stations during the Danish acoustic survey with R/V Dana in June-July 2020.

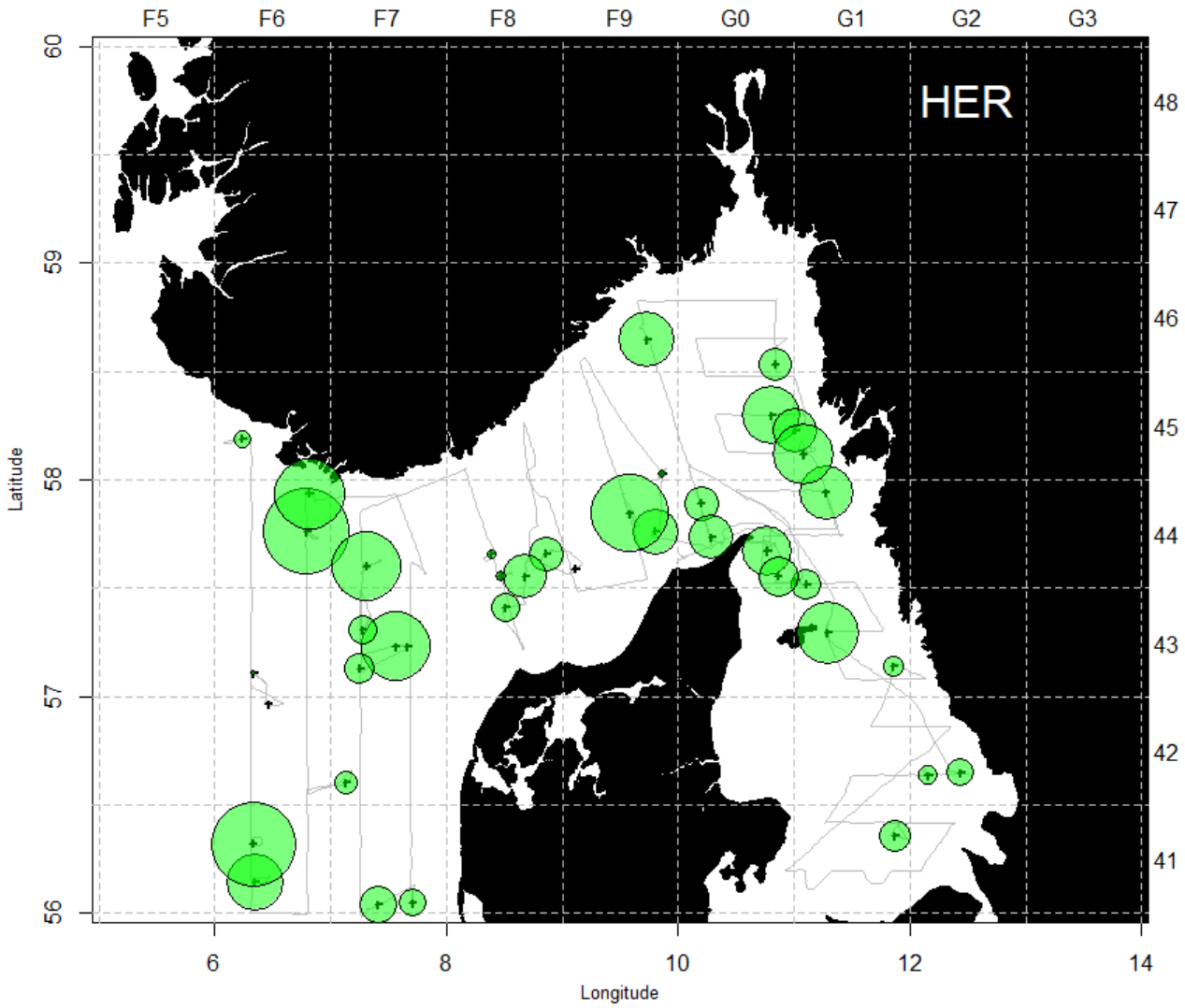

Figure 5. Catches of herring during the Danish acoustic survey with R/V Dana in June-July 2020. Black crosses indicate trawl positions, green circles catches of herring with the size of bubble representing the size of the catch. Largest bubble represent a catch of 742 kg.

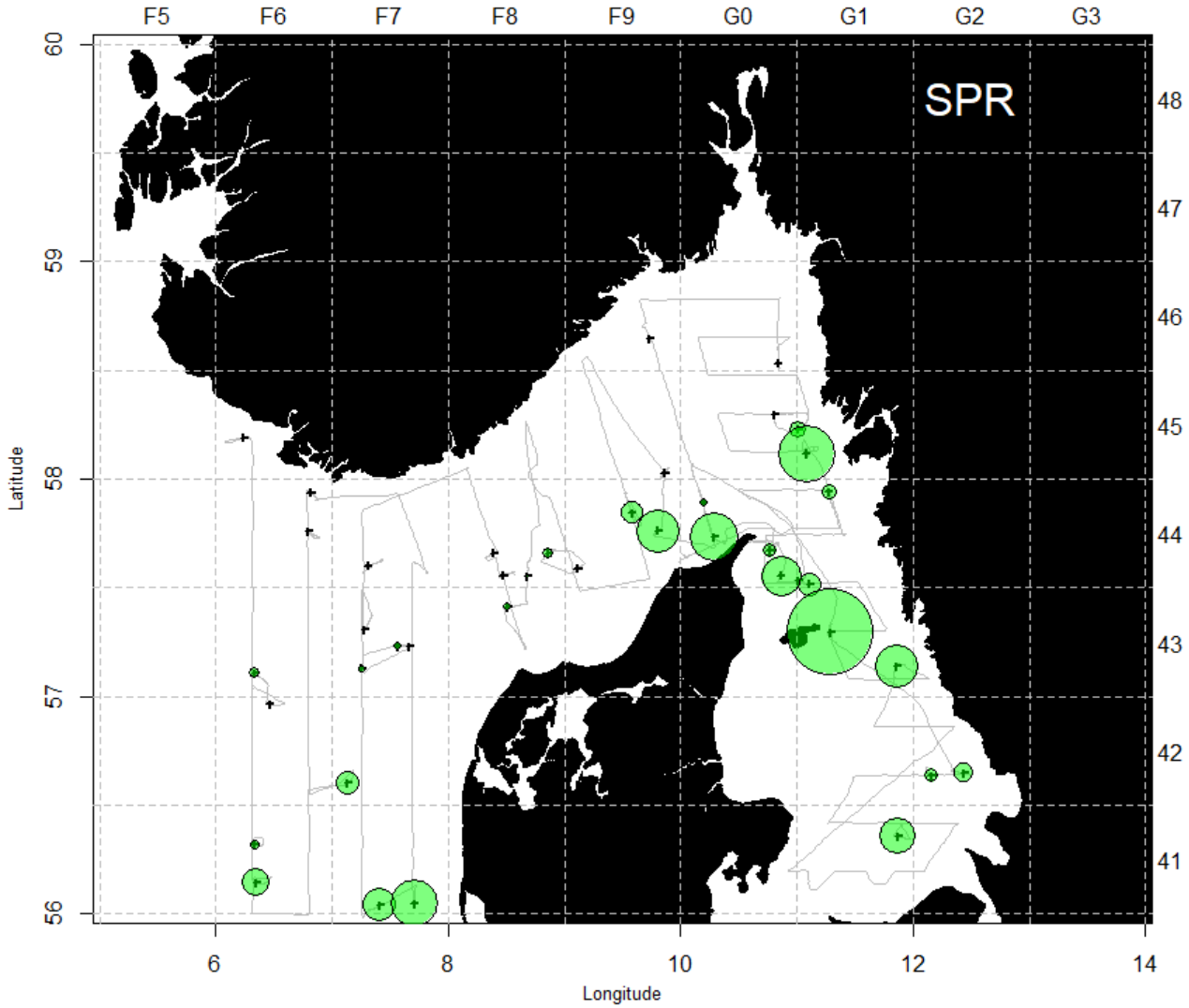

Figure 6. Catches of sprat during the Danish acoustic survey with R/V Dana in June-July 2020. Black crosses indicate trawl positions, green circles catches of sprat with the size of bubble representing the size of the catch. Largest bubble represent a catch of 2467 kg.

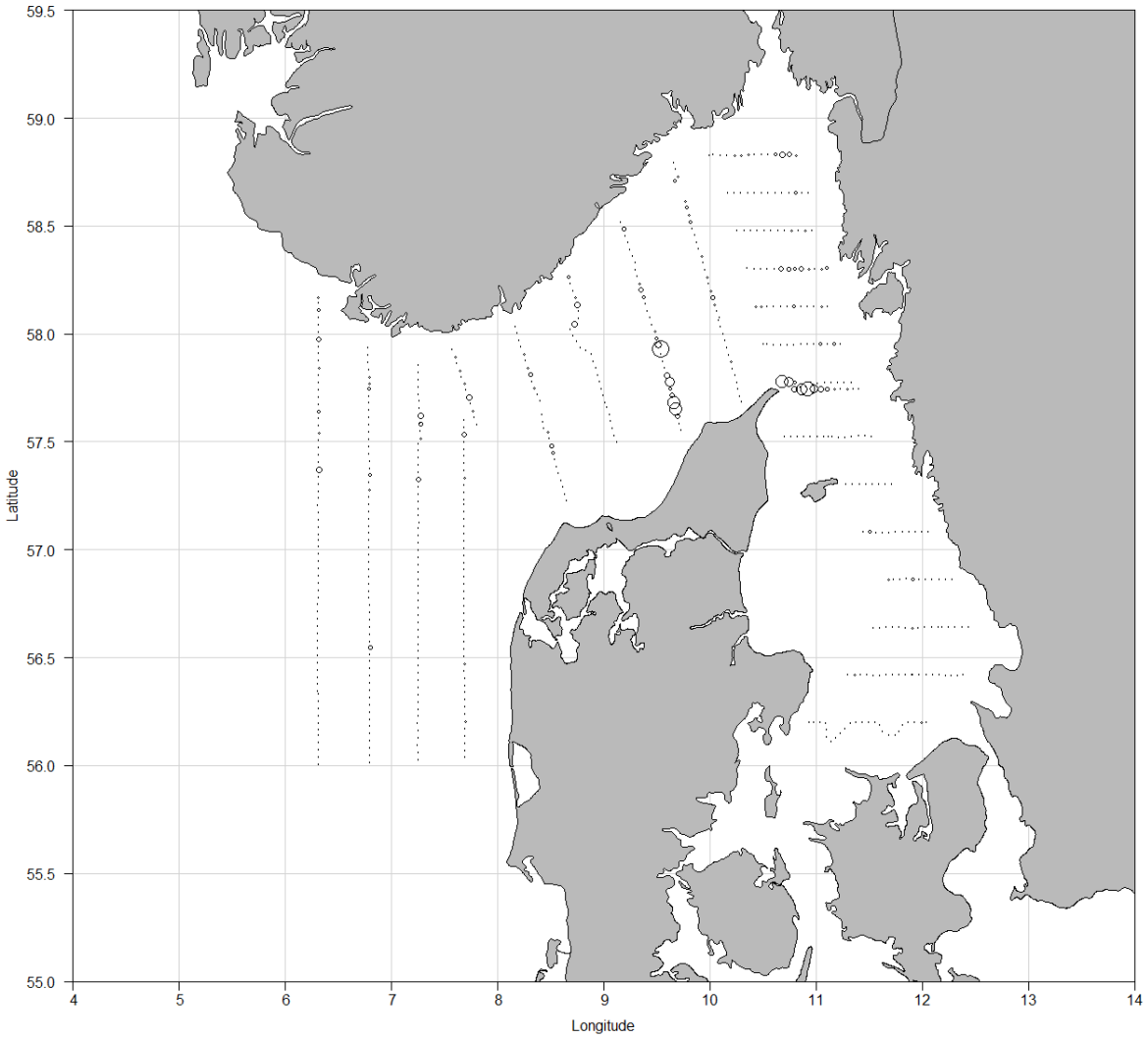

Figure 7. Distribution of NASC attributed to herring during the Danish acoustic survey with R/V Dana in June-July 2020. Largest circle represent NASC = 2398.9 m^2nmi^{-2}.

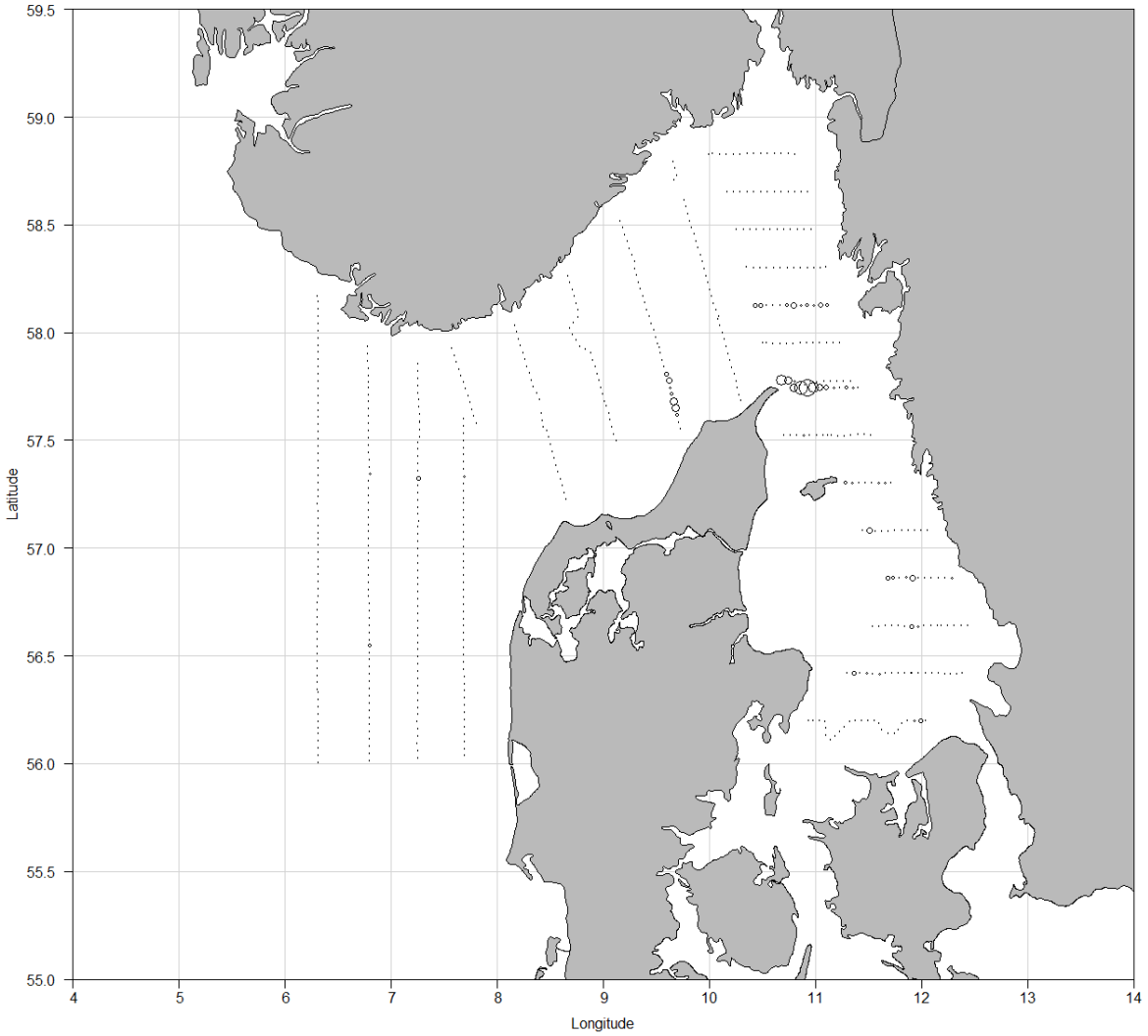

Figure 7. Distribution of NASC attributed to sprat during the Danish acoustic survey with R/V Dana in June-July 2020. Largest circle represent NASC = 2197.3 m2nmi-2.

Table 1. Simrad EK60 and analysis settings used during the Herring Acoustic Survey with R/V Dana in June-July 2020

Transceiver Menu	
Frequency	38 kHz
Sound speed (North Sea and Skagerrak)	1484 $m.s^{-1}$
Sound speed (Kattegat)	1504 $m.s^{-1}$
Max. Power	2000 W
Equivalent two-way beam angle	-20.5 dB
Transducer Sv gain	25.19 dB
3 dB Beamwidth	6.9°
Calibration details	
TS of sphere	-33.67 dB
Range to sphere in calibration	10.30 m
Measured NASC value for calibration	19300 m^2/nmi^2
Calibration factor for NASCs	1.00
Absorption coeff	6.691 dB/km
Log Menu	
Distance	1,0 n.mi. using GPS-speed
Operation Menu	
Ping interval	1 s external trig
Analysis settings	
Bottom margin (backstep)	1.0 m
Integration start (absolute) depth	7 - 9 m
Range of thresholds used	-70 dB

TABLE 2. TRAWL HAULS DETAILS FOR THE DANISH ACOUSTIC SURVEY WITH R/V DANA IN JUNE-JULY 2020.

Date	Haul	Time	ICES	Position		Trawl Direction	Wire length	Trawl type	Cath depth	Mean depth	Total catch	Main Species by weight	Trawling speed	Trawling duration	Wind speed	Sea state	Trawling distance
dd-mm-yy	no.	UTC	Square	Latitude	Longitude	deg.	m			m	kg		Kn	min.	m/s		NM
26-06-2020	1	00:20	45F6	58.11.372 N	006.14.575 E	262	205	FOTØ	Surface	315	45	Krill, Spurdogs, Mackerel	3.8	60	6.1	-	3.8
26-06-2020	83	11:19	43F6	57.06.416 N	006.20.355 E	130	300	EXPO	Bottom	58	138	Haddock, Whiting	4.0	60	6.8	-	3.9
26-06-2020	99	13:29	42F6	56.57.895 N	006.27.765 E	86	300	EXPO	Bottom	54	34	Haddock, Jelly fish	3.7	60	6.3	1	4.1
26-06-2020	157	21:18	41F6	56.19.234 N	006.20.038 E	227	195	FOTØ	Surface	42	887	Herring, Mackerel	3.9	60	8.0	1	3.9
27-06-2020	176	00:27	41F6	56.08.590 N	006.21.044 E	82	185	FOTØ	Surface	43	903	Mackerel, Herring, Jelly fish	4.0	60	8.7	2	4.1
27-06-2020	258	10:29	42F7	56.36.115 N	007.08.088 E	26	200	EXPO	Bottom	36	335	Jelly fish, Whiting	3.6	60	6.6	2	3.8
27-06-2020	352	21:26	44F6	57.45.498 N	006.47.919 E	124	185	FOTØ	Surface	333	840	Herring, Mackerel	3.8	51	8.7	2	3.1
28-06-2020	371	00:34	44F6	57.56.221 N	006.49.098 E	132	220	FOTØ	Surface	400	513	Herring, Mackerel, Jelly fish	2.5	60	10.1	3	2.6
28-06-2020	452	11:06	43F7	57.13.757 N	007.40.013 E	266	280	EXPO	Bottom	54	375	Haddock, Cod, Whiting	3.4	60	9.8	3	3.4
28-06-2020	533	21:24	41F7	56.02.758 N	007.42.366 E	6	130	FOTØ	Surface	29	416	Sprat, Mackerel, Jelly fish	3.9	60	10.4	4	4.0
29-06-2020	551	00:18	41F7	56.02.362 N	007.24.772 E	244	130	FOTØ	Surface	25	260	Mackerel, Sprat, Herring	3.2	60	10.5	4	3.0
29-06-2020	626	10:19	43F7	57.07.714 N	007.15.532 E	2	250	EXPO	Bottom	57	192	Jelly fish, Haddock, Whiting	3.2	60	11.6	4	3.2
29-06-2020	640	12:40	43F7	57.13.805 N	007.33.940 E	90	250	EXPO	Bottom	53	565	Herring, Haddock, Jelly fish	3.7	60	10.4	5	3.6
29-06-2020	699	21:21	43F7	57.18.377 N	007.16.794 E	25	150	FOTØ	Surface	67	120	Mackerel, Jelly fish, Herring	3.9	60	12.6	5	3.9
30-06-2020	719	00:20	44F7	57.36.096 N	007.18.500 E	88	150	FOTØ	Surface	301	563	Mackerel, Herring	3.6	60	9.6	5	3.7
30-06-2020	804	11:45	44F8	57.39.512 N	008.23.402 E	236	750	EXPO	Bottom	211	90	Shrimps, Blue Whiting, Argentines	3.6	50	16.0	5	2.6
30-06-2020	817	14:22	44F8	57.33.331 N	008.28.399 E	76	390	EXPO	Bottom	99	1200	Norway Pout, Cod, Haddock, Whiting	3.4	37	13.9	5	2.1
30-06-2020	863	21:25	43F8	57.24.527 N	008.30.775 E	76	150	FOTØ	Surface	37	115	Mackerel, Jelly fish, Herring, Sprat	4.4	60	15.2	5	4.5
30-06-2020	878	23:44	44F8	57.33.158 N	008.40.958 E	357	150	FOTØ	Surface	82	125	Herring, Mackerel, Jelly fish	3.8	60	17.8	5	3.9
01-07-2020	969	11:50	44F8	57.39.587 N	008.51.811 E	229	370	EXPO	Bottom	85	2244	Norway pout, Cod, Whiting	3.1	60	11.3	5	3.2
01-07-2020	985	15:10	44F9	57.35.359 N	009.06.799 E	53	170	EXPO	Bottom	34	120	Mackerel, Greater weever, Gurnard	3.6	30	10.5	3	1.8
01-07-2020	1058	23:03	44F9	57.50.595 N	009.34.914 E	158	150	FOTØ	Surface	48	555	Herring, Jelly fish	3.5	60	13.2	3	3.5
02-07-2020	1154	11:09	45F9	58.01.711 N	009.51.768 E	228	630	EXPO	Bottom	152	425	Blue whiting, Norway pout, Saithe	3.1	30	16.4	3	1.6
02-07-2020	1173	14:00	44F9	57.45.682 N	009.48.364 E	229	170	EXPO	Bottom	55	465	Whiting, Sprat, Herring	3.2	30	16.7	6	1.6
02-07-2020	1226	21:28	44G0	57.53.458 N	010.11.953 E	178	150	FOTØ	Surface	81	48	Jelly fish, Herring, Mackerel	3.2	60	14.5	6	3.2
02-07-2020	1238	23:51	44G0	57.43.932 N	010.17.181 E	102	-	FOTØ	Surface	26	490	Sprat, Mackerel, Herring	4.3	31	14.1	6	2.0
03-07-2020	EM1	09:12	44G0	57.40.233 N	010.46.007 E	37	150	EXPO	Bottom	25	338	Whiting, Herring	3.3	30	5.4	2	1.6
03-07-2020	EM2	10:51	44G0	57.40.369 N	010.46.160 E	33	150	EXPO	Bottom	25	291	Only mackerel picked out	3.9	30	8.9	2	1.9
03-07-2020	EM3	13:00	44G0	57.33.368 N	010.51.691 E	210	180	EXPO	Bottom	31	290	Sprat, Whiting, Herring	3.6	30	7.9	2	1.9
03-07-2020	EM4	14:43	44G1	57.31.959 N	011.00.767 E	66	235	EXPO	Bottom	40	420	Only mackerel picked out	3.4	30	9.9	3	1.8
04-07-2020	1403	01:06	46F9	58.38.710 N	009.44.124 E	327	155	FOTØ	Surface	446	145	Herring, Mackerel	3.4	60	1.0	3	3.6
04-07-2020	1475	10:26	46G0	58.31.818 N	010.50.336 E	357	480	EXPO	Bottom	95	220	Norway pout, Whiting, Jelly fish	3.2	60	4.5	3	3.3
04-07-2020	1568	21:28	45G0	58.17.753 N	010.48.499 E	176	150	FOTØ	Surface	172	510	Mackerel, Herring, Jelly fish	2.7	60	7.6	3	2.8
05-07-2020	1578	00:00	45G1	58.13.715 N	011.00.710 E	41	-	FOTØ	Surface	99	345	Krill, Mackerel, Herring	3.8	60	7.9	3	3.6
05-07-2020	1647	09:36	45G1	58.06.985 N	011.04.683 E	167	400	FOTØ	Surface	120	730	Sprat, Herring	3.7	50	15.4	3	3.0
05-07-2020	1737	21:12	44G1	57.31.065 N	011.06.450 E	271	150	FOTØ	Surface	40	130	Jelly fish, Mackerel, Sprat, Herring	4.0	60	15.3	3	3.8
06-07-2020	1839	10:20	43G1	57.08.405 N	011.51.446 E	195	240	EXPO	Bottom	56	185	Sprat, Jelly fish, Herring	3.2	60	17.7	6	3.2
07-07-2020	2031	11:45	41G1	56.21.389 N	011.52.138 E	100	190	EXPO	Bottom	32	243	Sprat, Dab, Mackerel, Whiting	3.1	60	11.5	3	3.1
07-07-2020	2100	21:16	42G2	56.38.131 N	012.09.451 E	129	150	FOTØ	Bottom	41	54	Jelly fish, Mackerel, Sprat, Herring	2.7	60	14.5	4	3.0
08-07-2020	2120	00:59	42G2	56.38.875 N	012.26.221 E	279	150	FOTØ	Bottom	31	75	Jelly fish, Herring, Sprat, Mackerel	3.6	60	17.5	4	3.5
08-07-2020	2186	11:07	43G1	57.17.591 N	011.17.365 E	175	245	EXPO	Bottom	44	3500	Sprat, Dab, Herring, Whiting	3.2	35	6.3	4	1.9
08-07-2020	2267	21:15	44G1	57.56.345 N	011.16.368 E	166	150	FOTØ	Surface	90	152	Herring, Mackerel	4.1	60	10.7	2	3.9

TABLE 3. CATCH COMPOSITION IN TRAWL HAULS FOR THE DANISH ACOUSTIC SURVEY WITH R/V DANA IN JUNE –JULY 2020

			Stratum	152	151	151	151	151	151	152	152	151	151	151	151	151	151	152	41	42	42	42	42	42
			Station	1	83	99	157	176	258	352	371	452	533	551	626	640	699	719	804	817	863	878	969	985
			ICES sq.	45F6	43F6	42F6	41F6	41F6	42F7	44F6	44F6	43F7	41F7	41F7	43F7	43F7	43F7	44F7	44F8	44F8	43F8	44F8	44F8	44F9
			Gear	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	EXPO
			Fishing depth	Surface	Bottom	Bottom	Surface	Surface	Bottom	Surface	Surface	Bottom	Surface	Surface	Bottom	Bottom	Surface	Surface	Bottom	Bottom	Surface	Surface	Bottom	Bottom
			Total depth	315	58	54	42	43	36	333	400	54	29	25	57	53	67	301	211	99	37	82	85	34
			Day/Night	N	D	D	N	N	D	N	N	D	N	N	D	D	N	N	D	D	N	N	D	D
%	**Common Name**	**Scientific Name**	**Total catch (kg)**	45.498	137.725	34.320	886.994	903.015	335.001	839.981	513.017	375.001	416.454	260.006	191.992	564.996	120.011	563.030	89.999	1199.997	114.985	125.013	2243.992	119.830
0.004	European common squid	Alloteuthis subulata	0.805										0.011	0.007	0.059	0.004								0.010
0.009	Anchovy	Engraulis encrasicolus	1.850					0.005					0.039											
0.056	Lesser silver smelt	Argentina spyraena	11.065																9.960					
1.191	Blue whiting	Micromesistius poutassou	234.459	2.770						0.793	0.263							2.930	10.230					
20.561	Sprat	Sprattus sprattus	4048.789		0.676		0.512	27.329	12.761				224.714	51.710	0.084	0.185					0.237	0.015	0.745	
0.088	Northern pink shrimp	Pandalus borealis	17.370																17.370					
0.043	Norway lobster	Nephrops norvegicus	8.473																0.736	0.100				
0.001	Lesser flying squid	Todaropsis eblanae	0.231																					
0.005	Four-bearded rockling	Enchelyopus cimbrius	0.976																0.872					
0.291	Greater weever fish	Trachinus draco	57.242					0.213			0.380			0.092				0.170						23.430
0.001	Solenette	Buglossidium luteum	0.125																					
0.002	Poor-cod	Trisopterus minutus	0.380		0.029										0.025	0.083				0.061			0.155	
0.004	Great silver smelt	Argentina silus	0.850																0.850					
0.000	Rabbitfish	Chimaera monstrosa	0.063																0.063					
0.088	Monk	Lophius piscatorius	17.420																					
0.036	Atlantic halibut	Hippoglossus hippoglossus	7.110																					
0.022	Horsemackerel	Trachurus trachurus	4.354										0.139				0.242							
0.132	Garfish	Belone belone	26.043				1.070	0.529		0.297	6.240							1.740						
0.168	American plaice	Hippoglossoides platessoides	33.134		0.415				0.031			0.110			0.619	0.295			3.759	14.369			1.634	
5.748	Whiting	Merlangius merlangus	1131.987	0.008	30.100	2.140	0.042	0.222	70.998	0.200	0.243	16.140	0.408	0.156	37.959	4.432	0.074	0.097		65.156	0.014	0.070	129.037	7.079
0.091	Southern shortfin Squid	Illex coindetii	17.992	0.109				0.210			0.258	0.893			0.760	0.858	1.283	0.789	1.274	3.600	0.088	0.277	1.294	
0.223	Invertebrates	Invertebrata	43.834									0.503	0.424	0.381		0.149			19.760	0.296			3.890	
3.300	Common dab	Limanda limanda	649.905		12.380	0.130			3.512			7.945		0.298	7.960	2.450				0.771			4.220	7.070
0.284	Hake	Merluccius merluccius	55.918		10.780	0.760			5.010			2.562			0.735				2.860	1.930			12.220	2.690
0.529	Grey gurnard	Eutrigla gurnardus	104.156		7.220	1.550	5.460	24.884	5.000			3.820	4.340	10.860	7.350	3.960	1.747			2.160	0.387		2.048	11.410
0.905	Krill	Euphausiidae	178.241	13.326																				
4.242	Haddock	Melanogrammus aeglefinus	835.340		57.888	15.610			11.089	0.001		292.283			42.008	151.711				68.951			59.623	0.061
0.000	Lesser weever	Echiichthys vipera	0.019											0.019										
0.001	Salmon	Salmo salar	0.130																					
0.006	European squid	Loligo vulgaris	1.176		0.209	0.206				0.761														
0.020	Ling	Molva molva	3.852																	2.006			0.718	
0.030	Northern squid	Loligo forbesii	5.887		0.382		0.208			0.265														0.389
0.063	Pollack	Pollachius pollachius	12.310																	7.100			5.210	
0.003	Sheppy argentine / Pearlside	Maurolicus muelleri	0.663	0.113							0.012								0.166					
12.344	Mackerel	Scomber scombrus	2430.853	4.869	0.100		141.457	697.617	1.600	66.125	93.879		100.081	140.914		4.341	82.352	208.166			78.035	53.099		54.930
0.268	Saithe	Pollachius virens	52.783																	3.730				0.484
0.574	Spiny dogfish	Squalus acanthias	112.983	20.300						0.204					1.920			2.732						
0.071	Pilchard	Sardina Pilchardus	13.920										2.313	11.020										0.038
0.006	Tub gurnard	Chelidonichthys lucerna	1.203											1.203										
0.000	Stout bobtail squid	Rossia macrosoma	0.001																		0.001			
0.076	Plaice	Pleuronectes platessa	14.938		0.509	0.180			0.754			1.900			1.331								1.030	1.251
0.208	Lemon sole	Microstomus kitt	40.899		1.397	0.362						2.170			18.380	0.953			0.082	13.530			0.942	1.043
0.000	Sand gobies	Pomatoschistus	0.006																					
0.000	Common dragonet	Callionymus lyra	0.061																					
22.109	Herring	Clupea harengus	4353.791	1.433	0.018		719.661	140.111	4.508	742.428	329.862		7.993	26.945	11.158	310.468	9.636	314.577	0.144	0.212	10.672	55.505	20.886	
0.004	Witch	Glyptocephalus cynoglossus	0.838																0.529					
0.002	Flounder	Platichthys flesus	0.367																					
0.010	Snake blenny	Lumpenus lampretaeformis	1.895																					
0.018	Hagfish	Myxine glutinosa	3.494																3.494					
0.000	Striped red mullet	Mullus surmuletus	0.074																					
0.001	Velvet belly	Etmopterus spinax	0.106																0.106					
15.112	Norway pout	Trisopterus esmarkii	2975.802		7.899										0.006		0.006		4.158	950.306			1817.083	
0.130	Pencil squids	Loliginidae	25.555		0.084							13.080		0.147	3.940	6.771					0.092			
0.063	Lumpfish	Cyclopterus lumpus	12.492	2.570						0.623								4.340	1.141					
5.728	Scyphozoans	Scyphozoa	1128.011		4.890	11.720	18.584	11.896	219.695	28.285	81.880	9.949	75.992	16.237	50.635	69.244	24.671	27.489		0.746	25.459	16.046	3.758	9.913
0.009	Silvery pout	Gadiculus argenteus	1.695																0.615					
0.002	Edible crab	Cancer pagurus	0.482																					
0.007	Greater sandeel	Hyperoplus lanceolatus	1.294		0.132				0.043			0.406			0.283	0.302								0.032
0.003	Sandeel	Ammodytes marinus	0.649		0.037							0.596		0.016										
1.568	Cod	Gadus morhua	308.782		2.580	1.662						22.644			6.780	8.790			7.430	64.190		0.001	179.500	
0.010	Starry ray	Amblyraja radiata	1.953																1.170	0.783				
0.001	Scaldfish	Arnoglossus laterna	0.118																					
0.024	Vahls eelpout	Lycodes vahlii	4.724																3.230					
3.505	Not sorted (EASIMACK haul)		690.140																					
100.000			19692.057	45.498	137.725	34.320	886.994	903.015	335.001	839.981	513.017	375.001	416.454	260.006	191.992	564.996	120.011	563.030	89.999	1199.997	114.985	125.013	2243.992	119.830

TABLE 3. CONTINUED.

			Stratum	42	41	42	42	42	21	21	21	21	41	31	31	31	31	21	21	21	21	21	21	31
			Station	1058	1154	1173	1226	1238	EM1	EM2	EM3	EM4	1403	1475	1568	1578	1647	1737	1839	2031	2100	2120	2186	2267
			ICES sq.	44F9	45F9	44F9	44G0	44G0	44G0	44G0	44G0	44G1	46F9	46G0	45G0	45G1	45G1	44G1	43G1	41G1	42G2	42G2	43G1	44G1
			Gear	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	EXPO	EXPO	EXPO	FOTØ	EXPO	FOTØ	FOTØ	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	FOTØ
			Fishing depth	Surface	Bottom	Bottom	Surface	Surface	Bottom	Bottom	Bottom	Bottom	Surface	Bottom	Surface	Surface	Surface	Surface	Bottom	Bottom	Bottom	Bottom	Bottom	Surface
			Total depth	48	152	55	81	26	25	25	31	40	446	95	172	99	120	40	56	32	41	31	44	90
			Day/Night	N	D	D	N	N	D	D	D	D	N	D	N	N	D	N	D	D	N	N	D	N
%	**Common Name**	**Scientific Name**	**Total catch (kg)**	555.001	425.006	464.997	47.818	490.007	337.999	291.000	289.998	420.000	144.989	220.003	510.005	344.981	730.000	130.000	184.996	243.003	54.383	75.000	3500.002	152.010
0.004	European common squid	Alloteuthis subulata	0.805			0.150		0.008	0.295											0.008			0.249	0.004
0.009	Anchovy	Engraulis encrasicolus	1.850					0.237			0.009				0.018			0.111				0.732	0.437	0.262
0.056	Lesser silver smelt	Argentina spyraena	11.065		1.061									0.044										
1.191	Blue whiting	Micromesistius poutassou	234.459		217.473																			
20.561	Sprat	Sprattus sprattus	4048.789	10.492		151.005	0.190	243.216	1.922		117.563					3.715	473.308	13.931	157.665	79.943	1.857	6.200	2466.738	2.077
0.088	Northern pink shrimp	Pandalus borealis	17.370																					
0.043	Norway lobster	Nephrops norvegicus	8.473		1.068				0.176					0.735					1.489	2.575			1.594	
0.001	Lesser flying squid	Todaropsis eblanae	0.231											0.029	0.202									
0.005	Four-bearded rockling	Enchelyopus cimbrius	0.976		0.040														0.019	0.045				
0.291	Greater weever fish	Trachinus draco	57.242	1.991				6.140	1.239		2.900					0.486		0.642			1.525	1.049	16.523	0.462
0.001	Solenette	Buglossidium luteum	0.125																				0.125	
0.002	Poor-cod	Trisopterus minutus	0.380											0.027										
0.004	Great silver smelt	Argentina silus	0.850																					
0.000	Rabbitfish	Chimaera monstrosa	0.063																					
0.088	Monk	Lophius piscatorius	17.420			15.810								1.610										
0.036	Atlantic halibut	Hippoglossus hippoglossus	7.110											7.110										
0.022	Horsemackerel	Trachurus trachurus	4.354					2.710	0.287		0.976													
0.132	Garfish	Belone belone	26.043					15.500							0.478			0.189						
0.168	American plaice	Hippoglossoides platessoides	33.134		1.201									5.113					1.882	3.456			0.249	
5.748	Whiting	Merlangius merlangus	1131.987	1.764	0.405	179.770	0.283	9.287	213.351		105.282		0.153	46.688	0.269	0.436	0.390	1.899	3.331	24.123	0.099		179.626	0.255
0.091	Southern shortfin Squid	Illex coindetii	17.992		0.419	0.262	0.254		1.218		0.382		0.487	1.432	0.248	0.612	0.451	0.272						0.262
0.223	Invertebrates	Invertebrata	43.834		0.404			0.018			0.246			10.460					0.799	4.384			2.121	
3.300	Common dab	Limanda limanda	649.905			5.440	0.044	0.042	18.006		4.620									71.617		0.073	503.327	
0.284	Hake	Merluccius merluccius	55.918		1.440	4.190			2.068	2.890	1.288			1.850					0.545				2.100	
0.529	Grey gurnard	Eutrigla gurnardus	104.156		0.299	2.820		0.071	0.944		0.047			0.368					0.995	2.640		0.315	3.462	
0.905	Krill	Euphausiidae	178.241													164.915								
4.242	Haddock	Melanogrammus aeglefinus	835.340		17.050	0.390			0.209		0.098			8.292			0.184	0.017	0.411	0.941			108.524	
0.000	Lesser weever	Echiichthys vipera	0.019																					
0.001	Salmon	Salmo salar	0.130																			0.130		
0.006	European squid	Loligo vulgaris	1.176																					
0.020	Ling	Molva molva	3.852		1.128																			
0.030	Northern squid	Loligo forbesii	5.887			4.446																	0.197	
0.063	Pollack	Pollachius pollachius	12.310																					
0.003	Sheppy argentine / Pearlside	Maurolicus muelleri	0.663		0.028								0.005				0.339							
12.344	Mackerel	Scomber scombrus	2430.853	6.648		32.226	4.187	151.998	8.692	4.826	1.366	13.144	11.925		304.841	75.095		13.685		26.599	8.193	5.479	9.255	25.129
0.268	Saithe	Pollachius virens	52.783		42.040				0.243					1.372			4.820				0.016	0.018	0.028	0.032
0.574	Spiny dogfish	Squalus acanthias	112.983			1.920					12.730		0.612	18.830		4.650	35.325	9.800	3.960					
0.071	Pilchard	Sardina Pilchardus	13.920								0.050												0.499	
0.006	Tub gurnard	Chelidonichthys lucerna	1.203																					
0.000	Stout bobtail squid	Rossia macrosoma	0.001																					
0.076	Plaice	Pleuronectes platessa	14.938			2.974		0.432	1.193										0.261	2.180			0.943	
0.208	Lemon sole	Microstomus kitt	40.899			0.185			0.257		0.019			0.498					0.233	0.626			0.222	
0.000	Sand gobies	Pomatoschistus	0.006								0.006													
0.000	Common dragonet	Callionymus lyra	0.061			0.057													0.004					
22.109	Herring	Clupea harengus	4353.791	497.895	0.087	56.987	18.650	52.847	82.227		34.693		127.749	16.167	160.355	53.262	182.777	10.899	2.860	15.307	1.754	8.744	202.827	121.490
0.004	Witch	Glyptocephalus cynoglossus	0.838											0.309										
0.002	Flounder	Platichthys flesus	0.367																	0.367				
0.010	Snake blenny	Lumpenus lampretaeformis	1.895											1.807						0.088				
0.018	Hagfish	Myxine glutinosa	3.494																					
0.000	Striped red mullet	Mullus surmuletus	0.074					0.074																
0.001	Velvet belly	Etmopterus spinax	0.106																					
15.112	Norway pout	Trisopterus esmarkii	2975.802		134.541									55.809			5.994							
0.130	Pencil squids	Loliginidae	25.555					0.047	1.370		0.023													
0.063	Lumpfish	Cyclopterus lumpus	12.492										0.229				3.510				0.079			
5.728	Scyphozoans	Scyphozoa	1128.011	36.212	0.435	1.932	24.210	7.381	2.570		5.663		3.829	39.957	43.593	41.811	22.902	78.555	9.972	6.744	40.860	52.260		2.037
0.009	Silvery pout	Gadiculus argenteus	1.695		1.080																			
0.002	Edible crab	Cancer pagurus	0.482																0.482					
0.007	Greater sandeel	Hyperoplus lanceolatus	1.294						0.021											0.075				
0.003	Sandeel	Ammodytes marinus	0.649																					
1.568	Cod	Gadus morhua	308.782		3.340	4.400			1.680		2.012			1.496					0.089	1.231			0.957	
0.010	Starry ray	Amblyraja radiata	1.953																					
0.001	Scaldfish	Arnoglossus laterna	0.118			0.034			0.030											0.054				
0.024	Vahls eelpout	Lycodes vahlii	4.724		1.468						0.026													
3.505	Not sorted (EASIMACK haul)		690.140							283.284		406.856												
100.000			19692.057	555.001	425.006	464.997	47.818	490.007	337.999	7.716	289.998	13.144	144.989	220.003	510.005	344.981	730.000	130.000	184.996	243.003	54.383	75.000	3500.002	152.010

Table 4. Measured length distribution of herring by haul for the Danish acoustic survey with R/V Dana in June-July 2020.

Station	1	83	157	176	258	352	371	533		551	626	640	699	719	804	817	863	878	969	1058	1154	1173	1226
Stratum	152	151	151	151	151	152	152	151		151	151	151	151	152	41	42	42	42	42	42	41	42	42
ICES sq.	45F6	43F6	41F6	41F6	42F7	44F6	44F6	41F7		41F7	43F7	43F7	43F7	44F7	44F8	44F8	43F8	44F8	44F8	44F9	45F9	44F9	44G0
Gear	FOTØ	EXPO	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	FOTØ		FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	FOTØ	EXPO	EXPO	FOTØ
Fishing depth	Surface	Bottom	Surface	Surface	Bottom	Surface	Surface	Surface		Surface	Bottom	Bottom	Surface	Surface	Bottom	Bottom	Surface	Surface	Bottom	Surface	Bottom	Bottom	Surface
Total depth	315	58	42	43	36	333	400	29		25	57	53	301	211	99	37	82	66	85	48	152	56	81
Day/Night	N	D	N	N	D	N	N	N		N	D	D	N	N	D	D	N	N	D	N	D	D	N
Total catch (kg)	45.498	137.725	886.994	903.015	335.001	839.981	513.017	416.454		260.006	191.992	564.996	120.011	563.030	89.999	1199.997	114.985	125.013	2243.992	555.001	425.006	464.997	47.818
Total weight herring (kg)	1.386	0.016	719.661	140.111	4.508	742.428	329.862	7.837	0.156	26.945	11.158	310.468	55.505	9.596	314.577	0.133	0.200	10.672	20.886	497.895	0.087	56.987	18.643
Subsample category								Small	Large														
Subsample weight (kg)	1.386	0.016	28.389	20.825	4.508	52.970	37.733	3.034	0.156	18.725	11.158	23.042	33.157	9.596	64.134	0.133	0.200	10.672	20.886	28.944	0.087	5.522	18.643
5.5																							
6																							
6.5																							
7																							
7.5																							1
8								2														9	2
8.5								12														68	1
9								72												1		94	1
9.5								94											1			104	1
10								124												1		57	
10.5								72														36	
11								21														2	
11.5								1															
12										1													
12.5					2			3		9					1				1	1		1	1
13		1		7	7			4		28					5				4	6		10	1
13.5				12	13			3		59		7			8	1			13	16		25	
14				42	20			3		98	3	9			33	1	1		4	32		30	
14.5			10	125	28					168	2	21		1	45		4		11	46		29	
15			41	183	22					173		27			52	1	5		4	48		27	
15.5			135	154	23					116	12	17		1	43		2		7	45		12	1
16			180	90	10					39	2	27			31		2		8	56		7	
16.5			145	34	9					9	8	26			18	1	4		2	52			
17			122	25	1		1			3	6	39			19	4	17		14	54			3
17.5			73	16	1					1	15	55			12	22	47		20	61		1	11
18			39	17	3	3	14			1	32	73			22	46	37	3	36	86		1	17
18.5			30	8	1	13	51				42	85			21	96	32	9	71	88			40
19			14	3	2	51	102			1	43	53			10	133	17	20	63	49			67
19.5			7	3	1	89	135				26	43	1		1	114	8	31	70	39			54
20	1				1	158	88		1		10	16			1	86	5	25	35	24			45
20.5	2			1	3	123	65				9	8	1	1		43	2	31	15	7		1	30
21	3				1	73	44			1	4	2				18	6	27	12	4			16
21.5	3					47	26									9		14	7	1			11
22						42	14										2	31	4		1		10
22.5	1				1	13	16		1					1	1	1		47	2				3
23	1				1	12	6					1				1	1	32	1				2
23.5	1					12	1									1		40					1
24						7	3											38	2				
24.5						3									1		1	46					
25						3	1											30	1				
25.5						3												42					
26						2												24					
26.5						2												18					
27						2												11					
27.5																		6					
28	2					2												5					
28.5						1												3					
29																		4					
29.5																		4					
30																		4					
30.5																							
31																		1					
31.5																		1					
Number measured	14	1	796	720	150	661	567	411	2	707	214	509	2	4	324	578	193	547	408	717	1	514	319
Raised number	14	1	20178600	4844160	150	9264576	4956714	1061613	2	1017373	214	6858266	2	4	324	967572	193	2683035	408	12333834	1	5304480	319
Mean length	22.4	13.0	16.5	15.4	15.2	20.6	19.9	9.9	21.3	14.7	18.4	17.6	20.0	18.3	15.8	19.2	18.0	23.2	18.5	17.0	22.0	10.8	19.3

Table 4. continued.

Station	1238	EM1	EM3	1403	1475		1568	1578		1647		1737		1839		2031		2100	2120	2186	2267	
Stratum	42	21	21	41	31		31	31		31		21		21		21		21	21	21	31	
ICES sq.	44G0	44G0	44G0	46F9	46G0		45G0	45G1		45G1		44G1		43G1		41G1		42G2	42G2	43G1	44G1	
Gear	FOTØ	EXPO	EXPO	FOTØ	EXPO		FOTØ	FOTØ		FOTØ		FOTØ		EXPO		EXPO		FOTØ	FOTØ	EXPO	FOTØ	
Fishing depth	Surface	Bottom	Bottom	Surface	Bottom		Surface	Surface		Surface		Surface		Bottom		Bottom		Bottom	Bottom	Bottom	Surface	
Total depth	25	25	31	446	95		172	99		120		40		56		32		41	31	44	90	
Day/Night	N	D	D	N	D		N	N		D		N		D		D		N	N	D	N	
Total catch (kg)	490.007	337.999	289.998	144.989	220.003		510.005	344.981		730.000		130.000		184.996		243.003		54.383	75.000	3500.002	152.010	
Total weight herring (kg)	52.847	82.227	34.693	127.749	11.587	4.588	160.355	24.850	28.412	157.627	25.148	8.845	2.054	0.317	2.542	0.459	14.848	1.754	8.744	202.827	8.780	112.709
Subsample category					Small	Large		Small	Large	Small	Large	Small	Large	Small	Large	Small	Large				Small	Large
Subsample weight (kg)	20.048	8.640	6.622	54.338	1.954	4.588	38.959	2.284	28.412	2.047	25.148	3.258	2.054	0.130	2.542	0.136	14.848	1.754	8.744	6.504	1.013	27.802
5.5																		2				
6																		4				
6.5																		13				
7					1							6						15			1	
7.5	15		22		7			3		5		6				4		25				
8	32		102		74			15		17		31		1		9		27		7	5	
8.5	7		125		217			43		26		85		3		13		22	1	32	4	
9	7		86		119			116		100		143		1		5		19	2	46	20	
9.5	4		77		35			132		135		162						5	1	50	55	
10	7		60		8			81		89		100		1				2	2	61	49	
10.5	3		31		2			31		22		49		6		2		7	2	110	27	
11	1		8					5		6		7		6				1		59	7	
11.5			2											1				2		16	1	
12	1		2								1		2							4		
12.5			2						5		4		1							5		
13	6						1		9		15		14							18		6
13.5	9		11			1			12		22		11		3					38		6
14	9	4	8						5		29		17		9		1			48		10
14.5	12	9	13				1		8		29		15		9		1			44		10
15	18	32	21			1	1		19		37		3		6		1		1	15		12
15.5	20	63	8			1			12		28		1		2				3	5		15
16	46	52	11			1			19		49		3		3		6		4			30
16.5	73	53	3			1	1		13		36		1		3		12	1	1			30
17	105	27	3	2		5	2		7		39		1		2		24	1	1			34
17.5	73	6	4	3		4	4		19		49		4				62	4	7			41
18	59	5	5	30		8	26		10		63				9		72	3	11			41
18.5	32	5	6	56		18	55		31		74				10		66	3	7			54
19	10	2	9	98		14	104		48		54		2		7		29	3	11			53
19.5	7	1	7	165		16	146		63		48		1		4		26	4	6			61
20	5	1	2	160		6	85		72		34				2		16	4	6			62
20.5	6		1	127		4	79		57		12		1		2		10	1	8	1		46
21	7	1	3	64		1	55		35		8				1		6	2	5			27
21.5	5			24		1	29		22		6						6		10			12
22	2	1	1	22		3	14		13		5						5		5			3
22.5				11			8		14				1				2		2			5
23	1			10		1	7		6		1		1						2			2
23.5				8			3		8		1		1						3			
24			1	6					5										2			
24.5				3			4		2										2			
25							1		2										1			
25.5				3																		
26				2															3			
26.5																						
27				1															2			
27.5																			4			
28																			2			
28.5																			3			
29				1																		
29.5																			2			
30																						
30.5																						
31																						
31.5																						
Number measured	582	262	634	796	463		626	426	516	400	644	589	80	19	72	33	345	170	122	559	169	560
Raised number	1534152	2493454	3321526	1871396	2746053	86	2576616	4634880	516	30907600	644	1599135	80	46436	72	111276	345	170	122	17432415	1625273	2270240
Mean length	15.9	16.1	10.3	20.0	8.6	18.8	19.8	9.4	19.0	9.4	17.3	9.3	14.8	10.2	16.8	8.4	18.4	9.7	20.1	11.3	9.7	18.4

Table 5. Measured length distribution of sprat by haul for the Danish acoustic survey with R/V Dana in June-July 2019.

Station	83	157	176	258	533	551	626	640	863	878	969	1058	1173
Stratum	151	151	151	151	151	151	151	151	42	42	42	42	42
ICES sq.	43F6	41F6	41F6	42F7	41F7	41F7	43F7	43F7	43F8	44F8	44F8	44F9	44F9
Gear	EXPO	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	FOTØ	EXPO
Fishing depth	Bottom	Surface	Surface	Bottom	Surface	Surface	Bottom	Bottom	Surface	Surface	Bottom	Surface	Bottom
Total depth	58	42	43	36	29	25	57	53	37	82	85	48	55
Day/Night	D	N	N	D	N	N	D	D	N	N	D	N	D
Total catch (kg)	137.725	886.994	903.015	335.001	416.454	260.006	191.992	564.996	114.985	125.013	2243.992	555.001	464.997
Total weight sprats (kg)	0.676	0.512	27.329	12.761	224.714	51.710	0.084	0.185	0.237	0.015	0.745	10.492	151.005
Subsample weight (kg)	0.676	0.512	3.535	3.752	2.109	3.888	0.084	0.185	0.237	0.015	0.745	3.129	2.670
6.5													
7													
7.5													
8													
8.5					1								3
9					14		1						8
9.5					39	1	1		1			1	19
10				4	43	6	2	2	1			1	41
10.5			15	25	55	44		2	1			7	77
11			71	91	37	111	1	1				39	80
11.5	2		102	84	19	87					17	68	20
12	6	2	52	31	4	25		2	2		13	54	8
12.5	6	9	23	15		11			2		13	29	2
13	5	10	7	9		6	1	5	2	1	4	11	1
13.5	12	3	5	7		1		1	3		3	14	
14	5	5	2	4		2	1		2		1	5	
14.5	1	1		1					1				
15	1												
15.5												1	
Number measured	38	30	277	271	212	294	7	13	15	1	51	230	259
Raised number	38	30	2141	922	22589	3910	7	13	14	1	51	771	14648
Mean length	13.1	13.1	11.6	11.5	10.3	11.3	10.9	11.9	12.5	13.0	12.2	11.9	10.6

Table 5. continued

Station	1226	1238	EM1	EM3	1578	1647	1737	1839	2031	2100	2120	2186	2267
Stratum	42	42	21	21	31	31	21	21	21	21	21	21	31
ICES sq.	44G0	44G0	44G0	44G0	45G1	45G1	44G1	43G1	41G1	42G2	42G2	43G1	44G1
Gear	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	FOTØ	EXPO	EXPO	FOTØ	FOTØ	EXPO	FOTØ
Fishing depth	Surface	Surface	Bottom	Bottom	Surface	Surface	Surface	Bottom	Bottom	Bottom	Bottom	Bottom	Surface
Total depth	81	26	25	31	99	120	40	56	32	41	31	44	90
Day/Night	N	N	D	D	N	D	N	D	D	N	N	D	N
Total catch (kg)	47.818	490.007	337.999	289.998	344.981	730.000	130.000	184.996	243.003	54.383	75.000	3500.002	152.010
Total weight sprats (kg)	0.190	243.216	1.922	117.563	3.715	473.308	13.931	157.484	79.943	1.857	6.200	2466.738	2.077
Subsample weight (kg)	0.190	2.903	1.922	2.508	0.622	2.186	2.506	3.228	3.420	1.857	3.539	1.961	2.077
6.5								1					
7						1		3					
7.5					1		2	2		2		5	
8					3	10	3	1	4	8	1	11	5
8.5		5		1	6	37	5	2	10	10		32	17
9	2	12	16	20	21	83	20	27	45	17	8	41	26
9.5	2	23	61	78	27	89	43	68	76	17	31	58	47
10	4	57	68	97	18	66	57	98	97	20	70	48	57
10.5	5	110	49	75	9	26	65	48	51	14	40	41	33
11	5	72	14	26	3	9	52	23	25	5	16	8	26
11.5		15	4	3			22	4	8	7	15	6	18
12	2	2	3	2			4	7	10	9	25		5
12.5							1	12	7	16	38	1	3
13		1	2				2	17	14	19	36		2
13.5							1	15	7	17	21		2
14								4	3	6	10		
14.5								3	5	5	6		
15										1			
15.5													
Number measured	20	297	217	302	88	321	277	335	362	173	317	251	241
Raised number	20	24883	217	14156	526	69502	1540	16344	8462	173	555	315732	241
Mean length	10.4	10.4	10.0	10.0	9.5	9.4	10.3	10.4	10.3	11.1	11.3	9.6	10.1

Table 6. Measured length distribution of mackerel by haul for the Danish acoustic survey with R/V Dana in June-July 2019.

Station	1	83	157	176	258	352	371	533	551	640	699	719	863	878	985	1058
Stratum	152	151	151	151	151	152	152	151	151	151	151	152	42	42	42	42
ICES sq.	45F6	43F6	41F6	41F6	42F7	44F6	44F6	41F7	41F7	43F7	43F7	44F7	43F8	44F8	44F9	44F9
Gear	FOTØ	EXPO	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	FOTØ	FOTØ	EXPO	FOTØ
Fishing depth	Surface	Bottom	Surface	Surface	Bottom	Surface	Surface	Surface	Surface	Bottom	Surface	Surface	Surface	Surface	Bottom	Surface
Total depth	315	58	42	43	36	333	400	29	25	53	67	301	37	82	34	48
Day/Night	N	D	N	N	D	N	N	N	N	D	N	N	N	N	D	N
Total catch (kg)	45.498	137.725	886.994	903.015	335.001	839.981	513.017	416.454	260.006	564.996	120.011	563.030	114.985	125.013	119.830	555.001
Total weight mackerel (kg)	4.869	0.100	141.457	697.617	1.600	66.125	93.879	100.081	140.914	4.341	82.352	208.166	78.035	53.099	54.930	6.648
Subsample weight (kg)	4.869	0.100	31.554	46.483	1.600	66.125	31.482	28.176	25.932	4.341	24.671	32.922	32.100	27.119	24.381	6.648
19				1					1						1	
20	1		1	8		1	5	11	3		2		3		8	4
21	7		11	38		11	18	65	22	2	7	10	20	23	58	7
22	16		20	51		82	86	122	61	4	19	77	92	90	100	13
23	20		22	98		170	117	61	60	13	43	115	130	106	59	19
24	2	1	17	84		72	51	16	38	11	33	50	48	37	13	12
25			13	49		23	21	1	1	3	10	14	3	2	1	1
26			13	18		8	3		5		4	7	3		1	
27			9	16		5	2	1	2		5	4	1	2	1	
28			12	13		6					9	3	1	2	1	
29			16	13		10			3	1	13	2	1		1	
30			10	5		12	3		1	1	9	1			1	1
31			6	2		4		1	3		5	3	2		2	4
32			6			8		2			2					
33	1		3			3			2		6			1	1	
34			3		1	7		3	3	1		1			1	
35			3	1	1	6		1	1				3	2		
36			2		1	10	1	1	2		3	2				
37			5		1	3		2	1							
38	1		3			6	1		1							
39						6	1		2			1		1		
40			1			3						1			1	
41						2										
42																
43									1							
44																
45						1										
46																
47												1				
Number measured	48	1	176	397	4	459	309	287	213	36	170	292	307	266	250	61
Raised number	48	1	789	5958	4	459	921	1019	1157	36	567	1846	746	521	563	61
Mean Length (cm)	22.9	24.0	26.7	23.9	35.5	25.1	23.1	22.5	23.8	23.9	25.3	23.6	23.0	22.9	22.4	23.2

Table 6. Continued.

Station	1173	1226	1238	EM1	EM2	EM3	EM4	1403	1568	1578	1737	2031	2100	2120	2186	2267
Stratum	42	42	42	21	21	21	21	41	31	31	21	21	21	21	21	31
ICES sq.	44F9	44G0	44G0	44G0	44G0	44G0	44G1	46F9	45G0	45G1	44G1	41G1	42G2	42G2	43G1	44G1
Gear	EXPO	FOTØ	FOTØ	EXPO	EXPO	EXPO	EXPO	FOTØ	FOTØ	FOTØ	FOTØ	EXPO	FOTØ	FOTØ	EXPO	FOTØ
Fishing depth	Bottom	Surface	Surface	Bottom	Bottom	Bottom	Bottom	Surface	Surface	Surface	Surface	Bottom	Bottom	Bottom	Bottom	Surface
Total depth	55	81	26	25	25	31	40	446	172	99	40	32	41	31	44	90
Day/Night	D	N	N	D	D	D	D	N	N	N	N	D	N	N	D	N
Total catch (kg)	464.997	47.818	490.007	337.999	7.716	289.998	13.144	144.989	510.005	344.981	130.000	243.003	54.383	75.000	3500.002	152.010
Total weight mackerel (kg)	32.226	4.187	151.998	8.692	4.826	1.366	13.144	12.025	304.841	75.095	13.685	26.599	8.193	5.479	9.255	25.129
Subsample weight (kg)	32.226	4.187	19.908	8.692	4.826	1.366	13.144	12.025	27.167	25.525	13.685	26.599	8.193	5.479	9.255	25.129
19																
20	4		7				1			1					1	5
21	27	6	21	5	2		10	10	18	15	8		1	3	1	20
22	64	10	53	20	10	3	32	33	91	74	43		16	8	6	82
23	76	11	60	27	21	4	53	48	121	99	53	1	18	24	17	73
24	47	8	31	4	10		19	20	42	47	17		16	14	9	22
25	7	1	10	2			5	2	6	10	4		4	3	3	3
26	4	2		2	1			1		1	1		1		1	2
27	2		1		2				1	1	2				1	
28	7		1				1								2	3
29	3		1	1			2						1	1		
30	3											2	2		2	2
31	5		1	1							1	3				2
32	2	1	1	3								1			3	1
33						1	1					5	1			1
34	1			1								2			2	1
35	2		1				1					7				1
36	2		1	1		1				1		4	1		1	6
37								2				11	1		1	
38	2		1	1								4	1		1	
39												5			2	
40												5				
41												3				
42												3				
43											1					
44												1				
45												1				
46																
47																
Number measured	258	39	190	68	46	9	125	116	279	249	130	58	63	53	53	224
Raised number	258	39	1451	68	46	9	125	116	3131	733	130	58	63	53	53	224
Mean Length (cm)	23.7	23.1	23.0	23.9	23.2	25.2	23.1	23.0	22.8	22.9	23.0	36.6	24.3	23.2	26.0	23.3

Table 7. CTD station details for the Danish acoustic survey with R/V Dana in June-July 2020.

Dana station	Date dd-mm-yy	Stat. no.	Time UTC	ICES Square	Position		Bottom depth m	Wind speed m/s	Seastate	Associated fishery station
					Latitude	Longitude				
8	26-06-20	1	01:48	45F6	58.10.418 N	006.05.307 E	294	7.6		1
9	26-06-20	83	10:06	43F6	57.02.268 N	006.19.040 E	57	7.7		83
13	26-06-20	99	14:51	42F6	56.58.204 N	006.35.541 E	51	5.8	1	99
14	26-06-20	157	20:38	41F6	56.19.631 N	006.18.782 E	44	7.7	1	157
18	27-06-20	176	01:55	41F6	56.10.209 N	006.28.663 E	41	8.0	2	176
19	27-06-20	258	09:38	42F7	56.35.424 N	007.03.730 E	36	7.3	2	258
22	27-06-20	352	20:38	44F6	57.46.138 N	006.47.444 E	342	7.2	2	352
26	28-06-20	371	02:00	44F6	57.54.469 N	006.52.634 E	401	10.0	3	371
27	28-06-20	452	10:31	43F7	57.13.595 N	007.41.467 E	51	8.9	3	452
30	28-06-20	533	20:51	41F7	56.01.583 N	007.42.346 E	28	11.3	3	533
34	29-06-20	551	01:49	41F7	56.01.347 N	007.18.902 E	31	10.5	4	551
35	29-06-20	626	09:35	43F7	57.07.348 N	007.15.458 E	50	8.0	4	626
39	29-06-20	640	14:06	43F7	57.14.310 N	007.41.957 E	53	11.6	5	640
40	29-06-20	719	20:44	43F7	57.17.281 N	007.15.597 E	61	12.4	5	719
44	30-06-20	804	01:45	44F7	57.37.666 N	007.25.816 E	314	12.6	5	804
45	30-06-20	817	10:36	44F8	57.40.194 N	008.25.397 E	214	9.0	5	817
49	30-06-20	863	15:50	44F8	57.34.201 N	008.33.783 E	92	17.0	5	863
50	30-06-20	878	20:43	43F8	57.24.283 N	008.28.442 E	47	13.0	5	878
54	01-07-20	699	01:08	44F8	57.37.638 N	008.42.029 E	100	15.3	5	699
55	01-07-20	969	10:15	44F8	57.40.436 N	008.53.517 E	92	10.8	5	969
60	02-07-20	1058	00:30	44F9	57.47.338 N	009.39.216 E	34	12.4	3	1058
64	02-07-20	1154	10:02	45F9	58.02.520 N	009.52.782 E	166	13.7	3	1154
68	02-07-20	1173	14:52	44F9	57.44.175 N	009.46.729 E	40	16.5	6	1173
69	02-07-20	1226	20:45	44G0	57.54.452 N	010.10.892 E	78	14.3	6	1226
73	03-07-20	1238	00:45	44G0	57.42.320 N	010.22.403 E	26	11.1	6	1238
78	04-07-20	1403	00:08	46F9	58.37.905 N	009.45.092 E	446	4.4	3	1403
81	04-07-20	1475	09:26	46G0	58.30.615 N	010.50.863 E	95	3.9	3	1475
84	04-07-20	1568	20:41	45G0	58.18.052 N	010.49.050 E	143	5.8	3	1568
87	04-07-20	1578	23:28	45G0	58.12.732 N	010.59.911 E	126	6.5	3	1578
89	05-07-20	1647	08:16	45G1	58.08.164 N	011.08.558 E	89	14.0	3	1647
92	05-07-20	1737	20:36	44G1	57.31.248 N	011.07.898 E	41	14.7	3	1737
95	06-07-20	1839	09:26	43G1	57.09.324 N	011.52.302 E	57	16.1	3	1839
98	07-07-20	-	06:50	41G2	56.11.891 N	012.05.738 E	25	14.6	6	-
99	07-07-20	2031	11:09	41G1	56.21.708 N	011.49.550 E	30	11.7	6	2031
102	07-07-20	2100	20:38	42G2	56.38.333 N	012.10.922 E	47	11.8	3	2100
106	08-07-20	2120	02:24	42G2	56.39.906 N	012.20.223 E	35	15.7	4	2120
107	08-07-20	2186	08:58	43G1	57.16.997 N	011.17.641 E	39	8.89	4	2186
110	08-07-20	2267	20:06	44G1	57.56.914 N	011.16.698 E	77	11.6	4	2267

Table 8. WP2 station details for the Danish acoustic survey with R/V Dana in June-July 2020.

Dana	Date	Station	Time	ICES	Position		Mean depth	Wind speed	Associated	Associated
Station	dd-mm-yy	no.	UTC	Square	Latitude	Longitude	m	m/s	CTD station	Fishery Station
10	26-06-20	83	10:22	43F6	57.02.228 N	006.18.977 E	54.0	7.7	83	83
15	26-06-20	157	20:51	41F6	56.19.631 N	006.18.746 E	44	7.9	157	157
20	27-06-20	258	09:55	42F7	56.35.527 N	007.03.763 E	36	7.2	258	258
23	27-06-20	352	20:59	44F6	57.46.133 N	006.47.487 E	342	8.2	352	352
28	28-06-20	452	10:42	43F7	57.13.642 N	007.41.513 E	53	10.4	452	452
31	28-06-20	533	21:04	41F7	56.01.772 N	007.42.248 E	27	11.5	533	533
36	29-06-20	626	09:50	43F7	57.07.543 N	007.15.309 E	51	9.4	626	626
41	29-06-20	699	20:56	43F7	57.17.413 N	007.15.714 E	61	11.5	699	699
46	30-06-20	804	11:03	44F8	57.40.252 N	008.25.446 E	217	12.6	804	804
51	30-06-20	863	20:54	43F8	57.24.480 N	008.28.646 E	46	14.3	863	863
56	01-07-20	969	10:32	44F8	57.40.582 N	008.53.807 E	93	10.0	969	969
63	02-07-20	1058	01:28	44F9	57.51.121 N	009.36.176 E	69	10.5	1058	1058
65	02-07-20	1154	10:24	45F9	58.02.861 N	009.53.421 E	166	13.1	1154	1154
70	02-07-20	1226	20:59	44G0	57.54.442 N	010.11.514 E	78	14.4	1226	1226
79	04-07-20	1403	00:33	46F9	58.37.913 N	009.44.935 E	466	3.7	1403	1403
82	04-07-20	1475	09:45	46G0	58.31.119 N	010.50.700 E	94	4.3	1475	1475
85	04-07-20	1568	21:01	45G0	58.18.258 N	010.48.797 E	143	5.5	1568	1568
90	05-07-20	1647	08:34	45G1	58.08.610 N	011.08.351 E	88	13.2	1647	1647
93	05-07-20	1737	20:51	44G1	57.31.180 N	011.07.714 E	41	14.8	1737	1737
96	06-07-20	1839	09:41	43G1	57.09.358 N	011.52.356 E	56	15.5	1839	1839
100	07-07-20	2031	11:20	41G1	56.21.748 N	011.49.812 E	30	12.7	2031	2031
103	07-07-20	2100	20:50	42G2	56.38.326 N	012.11.079 E	46	12.3	2100	2100
108	08-07-20	2186	09:11	43G1	57.16.946 N	011.17.692 E	39	6.9	2186	2186
111	08-07-20	2267	20:20	44G1	57.56.907 N	011.16.798 E	76	10.0	2267	2267

Table 9. Summary of Video recordings on EXPO demersal trawl stations for EASIMACK project. Counts and total weight of mackerel caught.

Date	Time	Stn.	Haul	Catch station ID	Individual Count	Weight (kg)	Weight % (Total Haul)	Bottom Depth (m)	Net Descent (min)	Trawl (min)	Net Ascent (min)	Number Cameras	Valid Recording (min)
27/06/2020	10:13:07	21	6	258	4	1.60	0.48	35.61	4	60	4	1	65.73
28/06/2020	10:57:07	29	9	452	0	0.00	0.00	53.53	8	60	5	2	59.82
29/06/2020	10:12:22	37	12	626	0	0.00	0.00	56.64	6	60	4	2	70.72
30/06/2020	11:29:09	47	16	804	0	0.00	0.00	207.23	17	60	6	1	75.86
30/06/2020	14:13:26	48	17	817	0	0.00	0.00	99.04	9	41	8	1	60.84
01/07/2020	11:36:22	57	20	969	0	0.00	0.00	84.87	9	60	6	2	69.27
01/07/2020	15:01:56	58	21	985	250	79.31	77.76	34.27	7	30	5	1	23.00
02/07/2020	10:54:53	66	23	1154	0	0.00	0.00	133.88	14	30	11	2	63.31
02/07/2020	13:55:55	67	24	1173	258	32.23	6.93	45.80	6	30	2	2	38.67
03/07/2020	09:03:59	74	27	EM1	68	26.84	7.94	25.26	5	30	2	2	41.18
03/07/2020	10:43:45	75	28	EM2	46	4.83	1.66	25.57	3	30	3	1	17.48
03/07/2020	12:53:18	76	29	EM3	9	1.37	0.47	30.86	5	30	3	2	42.38
03/07/2020	14:33:50	77	30	EM4	125	13.14	3.13	39.54	5	30	4	2	46.91
04/07/2020	10:14:08	83	32	1475	0	0.00	0.00	95.66	9	60	8	2	61.87
06/07/2020	10:09:10	97	37	1839	0	0.00	0.00	56.92	8	60	4	2	71.75
07/07/2020	11:34:01	101	38	2031	58	26.60	10.95	31.62	10	60	3	2	73.95
08/07/2020	10:58:45	109	41	2186	53	9.26	0.26	44.03	5	36	7	2	61.01