Baltic International Acoustic Survey

Report for R/V Aranda

Cruise 6/2025

ICES_BIAS_2025

17th – 30th September 2025

Juha Lilja

INTRODUCTION

International hydroacoustic surveys have been conducted in the Baltic Sea since 1978 (Håkansson et al. 1979). The initial Finnish-Estonian (FIN-EST) research survey on the R/V Baltica was realised in October 2006 (Grygiel et al. 2007), in the framework of the long-term ICES Baltic International Acoustic Surveys (BIAS) programme. The FIN-EST BIAS surveys on the R/V Baltica were continued until 2012. Since 2007, Finland and Sweden joined together to additionally cover Bothnian Sea (ICES Subdivision 30). In 2012 Sweden could not support the funding of the survey in the Bothnian Sea due to economic difficulties within the DCF program and therefore the coverage of the SD30 had to be based on Finnish funding which resulted in half the normal effort (ICES 2013). In 2013, Finland installed fishing equipment and a Simrad EK60 echo sounder into the R/V Aranda and used the vessel in order to cover ICES SDs 29N, 30, and 32N. In 2017, the R/V Aranda was in dry dock for major renovation and therefore Danish R/V Dana was hired for Finnish BIAS2017 survey. Since 2018, R/V Aranda was used again.

The Baltic International Acoustic Survey (BIAS) is mandatory for the countries that have exclusive economic zone (EEZ) in the Baltic Sea, and it is a part of the Data Collection Framework. The BIAS survey in September/October are co-ordinated and managed by the ICES working group WGBIFS. The main objective of BIAS is to assess clupeoid resources in the Baltic Sea. The survey will provide data to the ICES Baltic Fisheries Assessment Working Group (WGBFAS). The aim of the cruise was to carry out Baltic International Acoustic Survey on herring and sprat covering SDs 29N, 30, and 32N during the autumn 2025, within the remit of the Natural Resources Institute Finland (Luke).

MATERIALS AND METHODS

Narrative

The cruise was completed in two legs covering most of the Bothnian Sea (SD30), the Northern Baltic Sea (SD29) and the Gulf of Finland (SD32) (Figure 1). Altogether 43 stations of 49 planned were completed during the survey. The research area, cruise track and trawl stations are shown in Figure 2. At every trawl station and calibration site a CTD (Conductivity Temperature Depth) cast was made.

The R/V Aranda departed from the harbour of Helsinki (Finland) on Tuesday 17.09.2025 at 09:00 (UTC 06:00) and due to windy weather, the calibration of EK80 echosounder was shifted to be on 19.09.2025. After calibration the research begun. Investigations were continued in the western direction and then to Bothnian Sea (SD30). All at sea research were finalised before the noon 30.09.2025 and the vessel was navigated back to the port of Helsinki.

The Finnish BIAS 2025 survey had some deviation from the original plan when the trawling could not be performed due to stormy weather. In addition, Swedish authorities didn’t allow R/V Aranda to use scientific echo-sounder in the territorial water of Sweden. Therefore, any research investigations were not done in the Swedish territorial areas.

Survey design and hydrographical data

During the cruise, echo-integration was performed along the survey track from ICES Sub-Divisions 29N, 30, and 32N. A SeaBird CTD instrument (SBS 19 plus) was used with state-of-the-art sensors for salinity, temperature, oxygen, connectivity and depth.

Calibration

The SIMRAD EK80 echo sounder with 38, 120, and 200 kHz transducers were calibrated on 19.9.2025 on (N61°12.74', E019°15.75'), according to manuals (ICES 2017; Demer *et al*. 2015). The reference target strength of the 38.1 mm diameter tungsten carbide sphere under the prevailing conditions was calculated using a web page application (https://swfscdata.nmfs.noaa.gov/AST/SphereTS/). Values from the calibration were within required accuracy.

Acoustic data collection

The acoustic sampling was performed around the clock. SIMRAD EK80 echo sounder with the 38 kHz hull-mounted transducer (ES38B) was used for the acoustic data collection. The 120 and 200 kHz transducers were used only during trawling. The settings of the hydroacoustic equipment were as described in the IBAS manual (ICES 2017). The post processing of the stored raw data was done using the Echoview software (www.echoview.com). The mean volume back scattering values (Sv) were integrated over 1 nautical mile elementary distance sampling units (ESDUs) from 10 m below the surface to the bottom at 10 m intervals.

Data analysis

The pelagic target species sprat and herring are usually distributed in mixed layers in combination with other species so that it is impossible to allocate the integrator readings to a single species. Therefore, the species composition was based on the trawl catch results. For each rectangle the species composition and length distribution were determined as the unweighted mean of all trawl results in this rectangle. In the case of lack of sample hauls within an individual ICES rectangle (due to gear problems, bad weather conditions or other limitations) a mean from hauls from neighbouring rectangles was used. From these distributions the mean acoustic cross-section was calculated according to the target strength (TS) - length (L) relationships TS = m log L (cm) – a, where species specified constants m and a were found in list below. Calculations for Bothnian Sea herring were done with StoX software (Johnsen et.al. 2019), and other areas and species with Excel.

AcoCat	SpecCat	m	a
ABZ	Ammodytes tobianus	20	-71.2
ELE	Anguilla anguilla	20	-67.5
GAR	Belone belone	20	-67.5
HER	Clupea harengus	20	-71.2
LUM	Cyclopterus lumpus	20	-67.5
ENC	Enchelyopus cimbrius	20	-67.5
ANE	Engraulis encrasicolus	20	-67.5
COD	Gadus morhua	20	-67.5
GTA	Gasterosteus aculeatus	20	-71.2
GSE	Hyperoplus lanceolatus	20	-71.2
LAR	Lampetra fluviatilis	20	-67.5
LEM	Leptoclinus maculatus	20	-67.5
LIL	Liparis liparis	20	-67.5
LUL	Lumpenus lampretaeformis	20	-67.5
WHG	Merlangius merlangus	20	-67.5
TGQ	Myoxocephalus quadricornis	20	-67.5
MYS	Myoxocephalus scorpius	20	-67.5
NEM	Neogobius melanostomus	20	-67.5
NRO	Nerophis ophidion	20	-67.5
SME	Osmerus eperlanus	20	-71.2
FLE	Platichthys flesus	20	-71.2
PLE	Pleuronectes platessa	20	-67.5
GOB	Pomatoschistus	20	-71.2
POM	Pomatoschistus microps	20	-67.5
GPT	Pungitius pungitius	20	-71.2
SAL	Salmo salar	20	-71.2
TRS	Salmo trutta	20	-71.2
MAC	Scomber scombrus	20	-84.9
TUR	Scophthalmus maximus	20	-67.5
SPR	Sprattus sprattus	20	-71.2
SYM	Symphodus	20	-67.5
ELP	Zoarces viviparus	20	-67.5

The total number of fish (total N) in one rectangle was estimated as the product of the mean area scattering cross section s_A and the rectangle area, divided by the corresponding mean cross section δ (sigma). The total number was separated into different fish species according to the mean catch composition in the rectangle.

PERSONNEL

Cruise leader during the survey was Juha Lilja from Natural Resources Institute Finland (Luke). The acoustic measurements were performed by Natural Resources Institute Finland (Luke) as well as fish sampling. The participating scientific crew can be seen in the list below.

Scientific crew	Time	Organisation
Juha Lilja	17.09.2025 - 30.09.2025	LUKE
Perttu Rantanen	17.09.2025 - 30.09.2025	LUKE
Jukka Mehtonen	25.09.2025 - 30.09.2025	SYKE
Anu Lastumäki	17.09.2025 - 30.09.2025	SYKE
Nicolas Goni	25.09.2025 - 30.09.2025	LUKE
Jari Raitaniemi	17.09.2024 - 25.09.2025	LUKE
Hannu Harjunpää	17.09.2025 - 30.09.2025	LUKE
Ronja Routa	17.09.2025 - 30.09.2025	LUKE
Annie Pursiainen	17.09.2025 - 30.09.2025	LUKE
Erkki Jaala	17.09.2025 - 30.09.2025	LUKE
Riku Helisevä	17.09.2025 - 30.09.2025	LUKE
Tommi Lindroth	17.09.2025 - 30.09.2025	FISH
Toni Nikaniemi	17.09.2025 - 30.09.2025	FISH
Pasi Ala-opas	17.09.2025 - 30.09.2025	LUKE
Katja Kulo	17.09.2025 - 25.09.2025	LUKE
Jukka Pohtila	17.09.2025 - 30.09.2025	LUKE
Markku Gavrilov	17.09.2025 - 30.09.2025	LUKE
Carolina Åkerlund	17.09.2025 - 30.09.2025	SLU
Per Andersson	17.09.2025 - 25.09.2025	SLU
Mikko Kytökorpi	17.09.2025 - 30.09.2025	LUKE
Jukka Pönni	25.09.2025 – 30.09.2025	LUKE
Anna Lingman	25.09.2025 – 30.09.2025	SLU

LUKE: Luonnonvarakeskus / Natural Resources Institute Finland
SYKE: Suomen ympäristökeskus / Finnish Environment Institute
SLU: Sveriges lantbruksuniversitet / Swedish University of Agricultural Sciences

RESULTS

Fish catches, biological and hydro-meteorological data

The number of planned trawling stations was 49. From these, 43 trawling stations were accomplished, and from those all were counted as "valid" (technically sound hauls and sufficient catch for a sample) (Table 1). The total number of trawling stations in Bothnian Sea (ICES SD 30) was 29 and 9 in northern Baltic proper (SD 29). In addition, 5 trawl hauls were done in the northern Gulf of Finland (SD 32).

The 7551 kg combined catches (Table 1) consisted of 18 fish species (8299 kg) and mostly unidentified organic matter categorized as "waste" (229 kg), but also small amounts of common jellyfish *Aurelia aurita* (16 kg) and the isopod *Saduria entomon*. The most common and abundant species were herring (*Clupea harengus*) (6041 kg), sprat (*Sprattus sprattus*) (2082 kg) and three-spined stickleback (*Gasterosteus aculeatus*) (138 kg). All observed species are presented in Table 2. From the sub-samples of the 43 fish catches a total of 19425 measurements for species-specific length distributions (0,5 cm interval for herring and sprat, and 1 cm interval for other species) were performed according to Table 3.

Ten individual samples per statistical rectangle for age determination and maturity definitions by length-class were collected from herring and sprat, 5549 and 1638 samples respectively (Table 4). The mean weights for each length-class were also derived from these individual fish samples.
In addition, from BIAS survey on R/V Aranda 100 specimens of herring were collected from the Sea of Bothnia for contaminant analysis of Swedish Museum of Natural History (NRM). A pilot samples targeting the mysids were taken with vertical dipnet and towing multinet in 7 and 4 sample sites, respectively.

Hydrographical data: temperature (°C), oxygen concentration (ml/l), salinity (psu), sound speed (m/s), oxygen concentration (% saturation), conductivity (mS/cm) and sound speed (m/s) were measured. Total of 45 CTD casts were done during the entire cruise.

Abundance estimates

The total area covered by the Finnish BIAS survey was 21537 square nautical miles (nmi^2), 29 rectangles, and after the scrutinizing, the distance used for acoustic estimates was 1428 nautical miles (nmi). The cruise track and positions of trawl hauls are shown in Figure 2. Abundance of Bothnian Sea herring in SD 30 from 2007 to 2025 with StoX calculations are shown in Figure 3. The survey statistics e.g., total abundance of herring and sprat are presented in Table 6. Estimated numbers of herring and sprat by age group in Subdivision 29 and 32 are given in Table 7 and Table 10, respectively. Corresponding mean weights by age group in Subdivision 29 and 32 are shown in Table 8 and Table 11, respectively. Estimates of herring and sprat biomass by age group in Subdivision 29 and 32 are summarized in Table 9 and Table 12, respectively.
Survey statistics for Bothnian Sea herring SD 30 based on StoX calculations in 2025 are given in Table 13. Estimated numbers, biomass, and mean weight of Bothnian Sea herring by age group in SD 30 were summarized in Table 14, Table 15, and Table 16, respectively.

REFERENCES

Demer, D.A., Berger, L., Bernasconi, M., Bethke, E., Boswell, K., Chu, D., Domokos, R., et al. 2015. Calibration of acoustic instruments. ICES Cooperative Research Report No. 326. 133 pp.

Foote, K.G., Aglen, A. and Nakken, O. 1986. Measurement of fish target strength with a split-beam echosounder. J. Acoust. Soc. Am. 80(2):612-621.

Grygiel, W., O. Kaljuste, A. Grelowski and J. Pönni 2007. Research report from the Estonian-Finnish-Polish BIAS type survey in the north-eastern Baltic (October 2006). Working paper on the WGBIFS meeting in Rostock, 26-30.03.2007; 23 pp., [in:] ICES CM 2007/LRC:06, Ref. ACFM.

Håkansson, N., Kollberg, S., Falk, U., Götze, E. and Rechlin, O. 1979. A hydroacoustic and trawl survey of herring and sprat stocks of the Baltic proper in October 1978. Fischerei-Forschung, Wissenschaftliche Schriftenreihe 17(2):7-2.

ICES 1983. Report of the Planning Group on ICES coordinated herring and sprat acoustic surveys. ICES C.M. 1983/H:12.

ICES 2017. Manual for the International Baltic Acoustic Surveys (IBAS), Version 2.0. Series of ICES Survey Protocols, SISP 8 – IBAS.

Johnsen, E., Totland, A., Skålevik, Å., Holmin, A. J., Dingsør, G. E., Fuglebakk, E., and Handegard, N. O. 2019. StoX: An open source software for marine survey analyses. Methods in Ecology and Evolution. 10 :1523 –1528.

TABLES, MAP, AND FIGURES

Table 1.Trawl catches (kg) by species/category during the Finnish BIAS-survey in 2025.

Haul number	SD	Rectangle	Ammodytes tobianus	Aurelia aurita	Clupea harengus	Cyclopterus lumpus	Gasterosteus aculeatus	Hyperoplus lanceolatus	Lampetra fluviatilis	Liparis liparis	Lumpenus lampretaeformis	Nerophis ophidion	Osmerus eperlanus	Platichthys flesus	Pomatoschistus minutus	Pungitius pungitius	Saduria entomon	Salmo salar	Sprattus sprattus	Triglopsis quadricornis	X-other animal sp.	Zoarces viviparus	Waste	Fish catch
1	29	48H2	0,004	0,496	61,11		7,711	0,332								0,532	0,004		159,8					229,5
2	29	48H1		2,721	621,4	0,225	1,814	0,028				0,001	0,008			0,017			150,6				49,23	774,1
3	29	49G9		1,511	88,35		1,052									0,002			1,43				7,66	90,83
4	30	50G8			263,6	0,026	0,529						0,032						1,121				1,708	265,3
5	30	50G8			131,5		0,132					0,001				0,001	0,006		1,08			0,001	4,265	132,7
6	30	51G7			71,63		0,16									0,002	0,048		0,935			0,001	2,221	72,73
7	30	51G8			45,25		0,186	0,014		0,016							0,031		0,3		2,103		1,1	47,87
8	30	51G8			308,8		0,138										0,001		0,351				5,705	309,3
9	30	52G9			99,41		0,256			0,847		0,002					0,002				2,957		3,528	103,5
10	30	52G8			42,87		0,082				0,006	0,001					0,004				0,179		1,27	43,14
11	30	53G8			199,7		0,144			0,013						0,001			1,458				0,643	201,4
12	30	53G8			143,6		0,936										0,008		1,302				1,191	145,8
13	30	53G9			32,43		1,509					0,001			0,001		0,006		0,24				0,92	34,18
14	30	53G9			109,5		1,291			0,124		0,001											3,12	110,9
15	30	54G8			117,6		0,332			0,56							0,002						3,473	118,5
16	30	55G9			323,2		0,062	0,001		0,107		0,001	0,012		0,001	0,021	0,003		5,815				10,74	329,3
17	30	55H0			133,7		0,065			0,073		0,001	0,044			0,003	0,013		10,72				3,4	144,6
18	30	54H0			239		0,025			0,098		0,001			0,001	0,005	0,012		1,74				9,149	240,8
19	30	54G9			37,86		0,03			0,159		0,001			0,003	0,001	0,043		0,65		0,088		2,78	38,79
20	30	54G9			34,04		0,047			0,302		0,001	0,022		0,004	0,001	0,01		0,3		0,053		4,59	34,77
21	30	54H0	0,008		137,4		0,101			0,395		0,003	0,139		0,003		0,019		1,2				1,742	139,2
22	30	53H0			108,4		0,051			0,826			0,017			0,001	0,017		0,529				5,133	109,9
23	30	53H0			165		0,134			0,348		0,001	0,017		0,004	0,004	0,011		4,254				1,23	169,8
24	30	52H0			169,7		8,883			0,021			0,075		0,004		0,011		17,15				9,154	195,8
25	30	52G9			219,5		0,869								0,004		0,03		8,479				2,131	228,8
26	30	52H0			117,4		2,967		0,097	0,301		0,005			0,002	0,001	0,015	0,292	9,397		0,236		7,281	130,7
27	30	51H0			63,59		1,432					0,005					0,001	1,89	0,641				0,436	67,56
28	30	51H0			81,04		31,84			0,012		0,001				0,005	0,005		3,096					116
29	30	50H0			141,8		15,05					0,001	0,044		0,004	0,002	0,004		2,177				3,906	159,1
30	30	50G9			68,93		18,09	0,001				0,001					0,001		0,142				2,83	87,17
31	30	51G9			66,52		5,007					0,001					0,002						1,371	71,53
32	30	51G9			114,9		3,1			0,047					0,002				0,026				1,923	118,1
33	29	48G9			299,8		6,229	0,026					0,022			0,038	0,024		15,95				0,953	322
34	29	48H0	0,002	0,321	150,6	0,143	10,74					0,001				0,075	0,001		13,12	0,099			4,937	174,7
35	29	47H0																						0
36	29	47H0		9,274	0,88	2,095	9,097	0,088				0,006				0,035			106,3				2,23	118,5
37	29	48H1		1,573	0,749	0,37	0,546									0,043			305,4				8,346	307,1
38	29	48H2			664,7	4,754	0,99	0,33				0,017				0,149			232,1				7,923	903,1
39	32	48H3			23,17	0,075	0,808					0,001				0,067			265,6				20,29	289,7
40	32	48H4		0,154	3,627		0,808						0,054			0,004		2,38	111,9				5,05	118,8
41	32	49H6			114,8		3,068					0,007	6,986			0,479		2,87	126,3				3,493	254,5
42	32	48H5			158,8		0,666						2,187			0,021	0,001		198,1				9,255	359,7
43	32	49H5			64,99		0,826					0,001	1,22	0,31		0,003	0,004		322,3				12,32	389,7
	Total		0,014	16,05	6041	7,688	137,8	0,82	0,097	4,249	0,006	0,063	10,88	0,31	0,033	1,513	0,339	7,432	2082	0,099	5,616	0,002	228,6	8299

Table 2. English, scientific, and Finnish names of observed species in Finnish 2025 BIAS-survey.

Fishnames		
English	**Scientific**	**Finnish**
Atlantic Salmon	Salmo salar	Lohi
Brown Trout	Salmo trutta	Meritaimen
Cod	Gadus morhua	Turska
Common Goby	Pomatoschistus microps	Liejutokko
Common Seasnail	Liparis liparis	Imukala
European Whitefish	Coregonus lavaretus	Siika
Flounder	Platichthys flesus	Kampela
Fourhorn Sculpin	Triglopsis quadricornis	Härkäsimppu
Great Sandeel	Hyperoplus lanceolatus	Isotuulenkala
Herring	Clupea harengus	Silakka
Lamprey	Lampetra fluviatilis	Nahkiainen
Lesser Sandeel	Ammodytes tobianus	Pikkutuulenkala
Lumpsucker	Cyclopterus lumpus	Rasvakala
Nine-spined Stickleback	Pungitius pungitius	Kymmenpiikki
Perch	Perca fluviatilis	Ahven
Pipefish	Syngnathus typhle	Särmäneula
Rock Gunnel	Pholis gunnellus	Teisti
Round Goby	Neogobius melanostomus	Mustatäplätokko
Ruffe	Gymnocephalus cernuus	Kiiski
Sand Goby	Pomatoschistus minutus	Hietatokko
Shorthorn Sculpin	Myoxocephalus scorpius	Isosimppu
Smelt	Osmerus eperlanus	Kuore
Snake Blenny	Lumpenus lampretaeformis	Elaska
Snake blenny	Zoarces viviparus	Kivinilkka
Sprat	Sprattus sprattus	Kilohaili
Straightnose Pipefish	Nerophis ophidion	Siloneula
Three-spined Stickleback	Gasterosteus aculeatus	Kolmipiikki
Turbot	Scophthalmus maximus	Piikkikampela
Vendace	Coregonus albula	Muikku

Table 3. Number of length measurements /species and Sub-Division in Finnish 2025 BIAS-survey.

Spices	29	30	32	Total
Ammodytes tobianus	4	2		6
Clupea harengus	2222	9206	1355	12783
Cyclopterus lumpus	21	1	1	23
Gasterosteus aculeatus	503	1345	370	2218
Hyperoplus lanceolatus	56	3	1	60
Lampetra fluviatilis		1		1
Liparis liparis		228		228
Lumpenus lampretaeformis		1		1
Nerophis ophidion	12	61	3	76
Osmerus eperlanus	2	14	201	217
Platichthys flesus			2	2
Pomatoschistus minutus	1	23		24
Pungitius pungitius	158	25	72	255
Salmo salar	1	6	2	9
Sprattus sprattus	1385	1269	865	3519
Triglopsis quadricornis	1			1
Zoarces viviparus		2		2
Total	**4366**	**12187**	**2872**	**19425**

Table 4. Individual samples of herring and sprat (for age determination) per SD in 2025.

	Sprat			Sprat	Herring			Herring	
Length	**29**	**30**	**32**	**total**	**29**	**30**	**32**	**total**	**Total**
50						1		1	1
55						1		1	1
60			2	2		2	2	4	6
65	18	1	6	25	1	2	1	4	29
70	53	1	17	71	1	8	1	10	81
75	50		34	84	9	24	6	39	123
80	42	1	18	61	15	54	20	89	150
85	21		1	22	29	56	24	109	131
90			1	1	12	18	15	45	46
95	2		10	12	13	6	14	33	45
100	10	3	15	28	12	4	12	28	56
105	44	12	50	106	8	3	7	18	124
110	54	61	50	165	2	5	8	15	180
115	55	68	34	157	8	2	15	25	182
120	51	68	40	159	15	11	47	73	232
125	53	116	30	199	24	52	48	124	323
130	53	136	24	213	50	89	49	188	401
135	38	123	11	172	60	136	50	246	418
140	14	92	1	107	61	170	46	277	384
145	4	46		50	61	182	45	288	338
150		4		4	61	190	40	291	295
155					61	191	40	292	292
160					57	189	33	279	279
165					54	191	35	280	280
170					51	191	19	261	261
175					49	185	11	245	245
180					24	178	1	203	203
185					10	147	1	158	158
190					7	111	4	122	122
195					3	74		77	77
200					1	36		37	37
205					1	27		28	28
210						9		9	9
215						5		5	5
220					1	1		2	2
225						1		1	1
230						1		1	1
235						1		1	1
250					1			1	1
270						1		1	1
Total	**562**	**732**	**344**	**1638**	**762**	**2555**	**594**	**3911**	**5549**

Table 5. Numbers and locations of fishing stations (WGS-84) during Finnish BIAS-survey in 2025.

Haul number	HaulName	SD	HaulStartTime	HaulDuration	HaulStartLatitude	HaulStopLongitude	HaulStopLatitude	HaulStopLongitude	HaulHeadropeDepth	HaulBottomDepth	HaulNetOpening
1	48H2-1	29	18.9.2025 0:27	20	59,56233	22,30433	59,55350	22,27250	22	70	15,6
2	48H1-1	29	18.9.2025 5:10	15	59,54900	21,25967	59,54467	21,23200	20	80	15
3	49G9-1	29	18.9.2025 14:30	75	60,03017	19,58567	60,00400	19,58567	79	200	13,5
4	50G8-1	30	18.9.2025 22:22	45	60,86267	18,80883	60,82983	18,79183	20,6	75	16,6
5	50G8-2	30	19.9.2025 2:01	45	60,86983	18,24067	60,88333	18,18100	19	60	16
6	51G7-1	30	19.9.2025 6:10	75	61,09150	17,95633	61,11533	17,84883	20	70	16,6
7	51G8-1	30	19.9.2025 22:31	75	61,30550	18,17833	61,26417	18,11267	23,8	75	15
8	51G8-2	30	20.9.2025 4:25	30	61,35750	18,69800	61,33633	18,67100	17,4	60	17,7
9	52G9-1	30	20.9.2025 9:56	66	61,60817	19,23417	61,57967	19,15400	70	90	15,8
10	52G8-1	30	20.9.2025 16:38	60	61,86517	18,29133	61,84000	18,20183	50	75	13
11	53G8-1	30	20.9.2025 21:46	45	62,12750	18,34200	62,09617	18,29667	11,1	90	15,3
12	53G8-2	30	21.9.2025 1:08	45	62,13100	18,82633	62,10633	18,78517	14,3	85	16,3
13	53G9-1	30	21.9.2025 6:20	60	62,18750	19,14983	62,14250	19,16983	15,8	75	17,4
14	53G9-2	30	21.9.2025 11:15	75	62,44383	19,24317	62,38800	19,22800	74,4	120	14
15	54G8-1	30	21.9.2025 18:27	75	62,65917	18,83800	62,60583	18,80733	75	140	14,7
16	55G9-1	30	22.9.2025 2:55	50	63,08183	19,64183	63,07433	19,54617	15,8	140	14,8
17	55H0-1	30	23.9.2025 22:22	30	63,10867	20,46333	63,12300	20,43067	20,6	80	18,4
18	54H0-1	30	24.9.2025 1:43	45	62,93200	20,34600	62,95800	20,29967	20	75	12
19	54G9-1	30	24.9.2025 5:16	45	62,88483	19,97650	62,91133	19,92933	20,6	90	18,4
20	54G9-2	30	24.9.2025 10:32	90	62,59133	19,58633	62,66317	19,50667	78	130	14
21	54H0-2	30	24.9.2025 21:52	60	62,61617	20,29050	62,64650	20,21250	17,4	80	17,2
22	53H0-1	30	25.9.2025 2:29	50	62,36433	20,55667	62,38700	20,49250	20,6	77	17,8
23	53H0-2	30	25.9.2025 5:35	60	62,26567	20,56550	62,29867	20,49783	22,2	80	12,9
24	52H0-1	30	25.9.2025 21:32	40	61,83467	20,65267	61,83200	20,58783	19	70	18
25	52G9-2	30	26.9.2025 1:01	50	61,83983	19,94583	61,85133	19,87133	20,6	100	18,3
26	52H0-2	30	26.9.2025 10:10	100	61,62850	20,55867	61,68133	20,41050	84	120	14,2
27	51H0-1	30	26.9.2025 16:50	120	61,35567	20,39067	61,41233	20,22533	76	120	13
28	51H0-2	30	26.9.2025 22:01	30	61,11067	20,48267	61,11150	20,53000	19,1	100	18,4
29	50H0-1	30	27.9.2025 1:24	60	60,92533	20,55333	60,90550	20,46917	19	70	17,6
30	50G9-1	30	27.9.2025 5:28	60	60,86467	19,85850	60,82800	19,80217	20,6	85	17,6
31	51G9-1	30	27.9.2025 9:20	60	61,08450	19,78917	61,13017	19,79000	66,5	125	14,6
32	51G9-2	30	27.9.2025 13:05	80	61,03017	19,43167	61,03100	19,31033	76	120	13
33	48G9-1	29	27.9.2025 23:19	30	59,98083	19,47850	59,96500	19,51617	17,8	80	18,1
34	48H0-1	29	28.9.2025 3:05	50	59,78767	20,05350	59,79333	20,13317	15,8	190	17,9
35	47H0-1	29	28.9.2025 9:47	30	59,12867	20,36633	59,12650	20,41150	23,8	110	17,5
36	47H0-2	29	28.9.2025 13:06	60	59,14833	20,78283	59,12933	20,86383	23,8	110	18
37	48H1-2	29	28.9.2025 17:34	27	59,52450	21,11067	59,52567	21,15067	12,7	70	19,5
38	48H2-2	29	28.9.2025 22:10	15	59,54100	22,15133	59,54217	22,17500	20,6	75	18,3
39	48H3-1	32	29.9.2025 3:51	5	59,54400	23,63667	59,53983	23,64133	22,5	80	18
40	48H4-1	32	29.9.2025 9:30	15	59,81150	24,91700	59,80400	24,93417	20,6	75	18,4
41	49H6-1	32	29.9.2025 21:27	13	60,07850	26,27617	60,07883	26,29833	15,8	60	16,5
42	48H5-1	32	30.9.2025 1:19	10	59,93767	25,45733	59,93017	25,46150	15,8	60	18,4
43	49H5-1	32	30.9.2025 4:17	5	60,02850	25,34500	60,02450	25,34717	15,8	65	16,8

Table 6. Survey statistics by area in SDs 29, 30 and 32 (r/v Aranda in 2025).

ICES SD	ICES Rect.	NM	N (million/nm²)	Area (nm²)	Sa (m²/nm²)	σ (cm²)	N total (million)	Herring (%)	Sprat (%)	Cod (%)	3-spinn. (%)
29	47H0	56	18,7749669	920,3	1250,74	0,666177	17278,6	3,08	69,11	0,00	27,65
29	48G9	40	3,74081112	772,8	668,86	1,787995	2890,899	72,31	7,71	0,00	19,73
29	48H0	62	13,3692592	730,3	1843,64	1,379017	9763,57	53,31	20,68	0,00	25,58
29	48H1	57	29,4644609	544	4451,92	1,510946	16028,67	30,07	68,11	0,00	1,74
29	48H2	59	24,2645153	597	3527,12	1,453613	14485,92	32,31	55,73	0,00	10,03
32	48H3	64	23,7922211	615,7	2484,62	1,044297	14648,87	3,31	93,68	0,00	2,87
32	48H4	45	15,1552036	835,1	1694,19	1,117892	12656,11	2,97	93,71	0,00	3,24
32	48H5	48	16,3924275	767,2	2139,79	1,305353	12576,27	25,08	72,84	0,00	1,57
29	49G9	24	1,23993478	564,2	241,25	1,945707	699,5712	85,73	2,63	0,00	11,62
32	49H5	24	25,4388216	306,9	3130,02	1,230411	7807,174	9,07	88,99	0,00	1,48
32	49H6	44	12,2292876	586,5	1579,13	1,29127	7172,477	27,85	60,88	0,00	7,82
30	50G8	29	1,79667873	833,4	461,57	2,569007	1497,352	96,66	1,33	0,00	1,96
30	50G9	57	2,85097372	879,5	249,96	0,87677	2507,431	28,09	0,07	0,00	71,82
30	50H0	16	2,96269244	795,1	353,16	1,192022	2355,637	46,67	1,06	0,00	52,21
30	51G7	20	3,48507439	614,5	915,78	2,627726	2141,578	93,68	3,00	0,00	3,24
30	51G8	77	2,16431076	863,7	555,14	2,564987	1869,315	96,61	0,75	0,00	2,56
30	51G9	64	0,66925418	865,8	121,21	1,811085	579,4403	64,09	0,02	0,00	35,84
30	51H0	46	1,68397213	865,7	215,28	1,278423	1457,815	48,76	1,15	0,00	49,66
30	52G8	60	2,10135582	852	557,22	2,651694	1790,355	99,10	0,00	0,00	0,71
30	52G9	63	1,92175559	852	405,94	2,112346	1637,336	59,98	23,81	0,00	15,10
30	52H0	62	1,6759778	852	222,41	1,327063	1427,933	37,14	18,43	0,00	43,52
30	53G8	62	0,95774779	838,1	229,78	2,399189	802,6884	77,09	11,84	0,00	10,85
30	53G9	69	0,92419511	838,1	175,30	1,896747	774,5679	70,11	0,45	0,00	29,32
30	53H0	73	1,23007786	838,1	301,23	2,448837	1030,928	95,20	2,78	0,00	1,11
30	54G8	18	0,61861932	642,2	160,34	2,591905	397,2773	94,57	0,00	0,00	4,61
30	54G9	76	0,98059122	824,2	246,21	2,510796	808,2033	94,62	2,15	0,00	1,82
30	54H0	44	3,53576407	727,9	784,91	2,219916	2573,683	97,28	1,30	0,00	1,00
30	55G9	22	1,86341407	625,6	448,35	2,406058	1165,752	96,37	2,85	0,00	0,45
30	55H0	47	2,61227356	688,6	578,28	2,213693	1798,812	87,07	11,07	0,00	1,70

Table 7. Numbers (millions) of herring by age in SDs 29 and 32 (r/v Aranda 2025).

SD	Rect	0	1	2	3	4	5	6	7	8+	Total
29	47H0	358,64	87,97	42,07	22,51	3,27	4,00	8,98	1,67	2,43	531,56
29	48G9	19,86	759,29	537,11	361,82	53,91	98,52	152,38	43,20	64,24	2090,32
29	48H0	419,15	1896,63	1124,83	763,00	118,66	231,62	333,87	97,31	219,84	5204,91
29	48H1	2398,86	390,22	672,43	578,13	94,92	197,79	253,78	88,66	145,29	4820,09
29	48H2	162,99	2010,05	996,79	688,60	108,28	209,41	281,67	92,16	130,99	4680,94
32	48H3	61,85	141,06	60,47	100,61	12,05	32,47	29,55	18,99	27,31	484,36
32	48H4	134,20	216,69	15,79	8,32	0,47	0,23	0,00	0,00	0,00	375,71
32	48H5	214,23	1119,17	512,94	696,73	69,52	172,35	133,64	105,20	130,45	3154,21
29	49G9	1,75	267,05	142,98	83,97	13,76	24,54	35,27	10,13	20,30	599,76
32	49H5	39,34	378,86	96,73	118,53	11,17	23,76	14,44	12,59	12,77	708,19
32	49H6	355,23	783,79	202,22	301,42	35,50	96,45	83,52	73,42	65,80	1997,35

Table 8. Mean weight (g) of herring by age in SDs 29 and 32 (r/v Aranda 2025).

SD	Rect.	SUM	0	1	2	3	4	5	6	7	8+
29	**47H0**	9,99	4,92	17,95	21,06	24,01	23,79	26,26	25,22	28,30	33,99
29	**48G9**	22,57	5,59	18,10	22,75	26,13	26,71	27,92	26,94	28,62	33,08
29	**48H0**	21,42	4,83	17,32	22,60	26,58	27,00	28,29	28,03	29,55	40,46
29	**48H1**	15,26	4,64	18,49	24,53	27,34	28,52	28,90	27,84	28,98	33,42
29	**48H2**	21,06	5,64	16,45	22,72	26,22	27,27	28,22	26,84	35,09	32,46
32	**48H3**	18,11	4,77	14,43	19,56	21,69	23,35	24,37	27,27	24,84	26,60
32	**48H4**	10,40	5,49	12,64	16,73	18,32	19,57	19,57			
32	**48H5**	18,11	5,51	14,65	18,96	20,98	22,26	23,90	25,61	25,27	26,34
29	**49G9**	21,88	11,07	17,51	22,28	26,31	27,85	28,24	26,74	28,19	35,90
32	**49H5**	16,38	6,36	14,10	18,40	20,71	21,93	23,19	24,43	23,84	25,66
32	**49H6**	15,94	5,21	13,43	19,43	21,41	22,79	24,05	26,78	26,60	26,69

Table 9. Total biomass (ton) of herring by age in SDs 29 and 32 (r/v Aranda 2025).

SD	Rect.	0	1	2	3	4	5	6	7	8+	Total
29	**47H0**	1766	1579	886	540	78	105	227	47	83	5311
29	**48G9**	111	13745	12221	9454	1440	2751	4105	1236	2125	47189
29	**48H0**	2023	32851	25423	20284	3204	6553	9360	2876	8895	111468
29	**48H1**	11119	7214	16495	15805	2707	5717	7065	2569	4856	73547
29	**48H2**	919	33068	22646	18057	2953	5909	7560	3234	4252	98598
32	**48H3**	295	2035	1183	2182	281	791	806	472	726	8772
32	**48H4**	737	2740	264	152	9	5	0	0	0	3907
32	**48H5**	1180	16401	9728	14617	1548	4119	3422	2659	3437	57110
29	**49G9**	19	4676	3186	2209	383	693	943	286	729	13125
32	**49H5**	250	5342	1779	2455	245	551	353	300	328	11603
32	**49H6**	1852	10524	3929	6452	809	2320	2236	1953	1756	31832

Table 10. Numbers (millions) of sprat by age and area (r/v Aranda 2025).

SD	Rect.	0	1	2	3	4	5	6	7	8+	Total
29	**47H0**	8917,7	1098,1	245,5	442,0	241,6	579,2	292,9	0,0	124,1	11941,0
29	**48G9**	0,0	134,4	12,7	21,0	10,1	26,2	13,3	0,0	5,0	222,7
29	**48H0**	1564,2	207,4	31,8	55,0	29,9	77,3	36,2	0,0	16,9	2018,7
29	**48H1**	1329,2	7682,3	312,9	488,2	230,6	565,2	211,0	15,2	82,0	10916,6
29	**48H2**	866,7	4798,3	312,3	542,5	274,6	750,3	353,2	11,2	164,6	8073,6
32	**48H3**	2456,7	10110,8	304,2	276,5	31,9	243,2	224,4	25,4	50,1	13723,4
32	**48H4**	790,7	9435,6	279,1	271,5	37,6	537,0	361,2	32,3	115,4	11860,4
32	**48H5**	822,1	7012,7	212,1	179,3	29,9	452,9	316,6	44,0	91,4	9161,0
29	**49G9**	0,6	12,9	0,7	1,1	0,6	1,5	0,7	0,0	0,2	18,4
32	**49H5**	698,9	4140,2	230,8	304,6	36,9	748,5	534,9	46,3	206,9	6947,8
32	**49H6**	205,0	2981,7	138,0	163,9	21,4	411,8	304,9	29,2	110,3	4366,3
30	**50G8**	0,0	6,9	1,5	2,5	0,9	4,5	2,1	0,3	1,5	20,0
30	**50G9**	0,0	0,0	0,1	0,2	0,1	0,6	0,4	0,0	0,3	1,8
30	**50H0**	1,0	3,0	1,8	3,3	1,2	7,4	4,0	0,5	2,7	25,0
30	**51G7**	0,0	25,6	5,4	8,8	2,5	12,9	5,4	0,6	3,1	64,3
30	**51G8**	0,0	2,4	1,0	2,0	0,7	4,0	2,0	0,2	1,6	14,0
30	**51G9**	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1
30	**51H0**	0,0	3,5	1,3	2,3	0,8	4,6	2,3	0,3	1,7	16,7
30	**52G8**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
30	**52G9**	0,0	38,8	25,4	50,2	20,5	121,4	64,9	7,7	61,0	389,8
30	**52H0**	0,9	31,4	15,9	31,3	13,3	80,5	44,4	5,4	40,2	263,2
30	**53G8**	0,0	6,0	8,6	15,2	5,3	31,7	16,1	1,9	10,3	95,0
30	**53G9**	0,0	0,2	0,3	0,5	0,2	1,1	0,6	0,1	0,5	3,5
30	**53H0**	0,0	6,2	1,3	2,3	1,1	8,0	4,7	0,5	4,6	28,7
30	**54G8**	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
30	**54G9**	0,0	2,2	1,0	1,9	0,8	5,4	3,0	0,3	2,8	17,4
30	**54H0**	0,0	2,1	2,4	4,5	1,7	10,7	5,6	0,6	5,7	33,3
30	**55G9**	0,0	4,0	1,4	2,9	1,4	9,4	5,4	0,6	7,9	33,2
30	**55H0**	0,0	11,7	16,0	30,2	11,0	65,5	34,0	4,1	26,7	199,2

Table 11. Mean weight (g) of sprat by age and area (r/v Aranda 2025)

SD	Rect.	0	1	2	3	4	5	6	7	8+	Average (g)
29	**47H0**	2,85	10,31	12,18	12,65	12,94	13,35	13,62		14,17	5,18
29	**48G9**		9,91	11,96	12,34	12,55	13,03	13,38		13,97	11,04
29	**48H0**	3,09	9,41	12,42	12,84	13,10	13,30	13,70		14,18	4,98
29	**48H1**	2,57	9,13	11,95	12,31	12,41	12,54	12,89	16,65	14,02	8,92
29	**48H2**	2,75	9,13	12,24	12,76	12,94	13,21	13,65	16,65	14,28	9,63
32	**48H3**	2,40	7,81	9,38	9,45	10,33	11,12	10,63	10,41	11,61	7,04
32	**48H4**	2,80	7,73	9,69	10,01	11,28	12,21	11,57	10,41	12,34	7,88
32	**48H5**	2,50	7,50	9,92	10,14	10,74	11,68	11,22	10,41	11,81	7,56
29	**49G9**	2,61	9,28	12,00	12,44	12,73	12,91	13,34		13,78	10,00
32	**49H5**	2,83	7,60	10,57	11,12	11,83	12,02	11,46	10,41	11,86	8,32
32	**49H6**	2,90	7,57	10,44	10,97	11,41	11,80	11,41	10,41	11,82	8,38
30	**50G8**		10,26	13,19	13,76	14,10	14,38	14,78	14,91	14,98	12,88
30	**50G9**		0,00	14,88	14,91	15,13	15,52	15,62	15,41	15,65	15,43
30	**50H0**	2,75	11,02	13,59	14,09	14,50	14,85	15,20	15,29	15,66	13,85
30	**51G7**		10,14	12,90	13,29	13,67	13,77	14,29	14,74	14,41	12,27
30	**51G8**		10,88	13,37	13,73	14,43	14,79	15,24	15,17	15,47	14,00
30	**51G9**		9,97	9,97							9,97
30	**51H0**		10,61	13,35	13,81	14,32	14,65	15,07	15,14	15,55	13,73
30	**52G8**										
30	**52G9**		10,43	13,87	14,26	14,71	15,10	15,36	15,22	16,04	14,62
30	**52H0**	2,50	10,63	13,87	14,37	14,77	15,20	15,44	15,32	16,11	14,59
30	**53G8**		11,08	13,61	13,91	14,37	14,65	14,99	15,10	15,32	14,34
30	**53G9**		10,95	13,74	14,11	14,49	14,84	15,11	15,06	16,02	14,63
30	**53H0**		10,36	13,79	14,69	15,10	15,63	15,80	15,59	16,57	14,48
30	**54G8**										
30	**54G9**		10,64	13,67	14,18	14,89	15,28	15,57	15,48	16,44	14,70
30	**54H0**		10,97	13,68	13,98	14,68	15,05	15,38	15,28	16,48	14,83
30	**55G9**		10,32	14,12	14,71	15,19	15,62	15,75	15,44	17,01	15,16
30	**55H0**		11,21	13,69	14,01	14,52	14,81	15,14	15,17	15,77	14,57

Table 12.Total biomass (ton) of sprat by age and area (r/v Aranda 2025).

SD	Rect.	0	1	2	3	4	5	6	7	8+	Total
29	**47H0**	25391	11322	2990	5593	3125	7730	3988	0	1758	61896
29	**48G9**	0	1332	152	259	127	342	178	0	70	2460
29	**48H0**	4839	1952	395	706	392	1028	496	0	240	10048
29	**48H1**	3410	70143	3741	6009	2861	7088	2718	254	1149	97373
29	**48H2**	2388	43789	3822	6923	3553	9914	4820	187	2351	77745
32	**48H3**	5893	78975	2853	2614	330	2704	2387	265	582	96601
32	**48H4**	2212	72940	2705	2718	424	6559	4178	337	1425	93497
32	**48H5**	2053	52625	2104	1817	322	5291	3552	458	1079	69301
29	**49G9**	1	120	8	14	8	20	9	0	3	184
32	**49H5**	1979	31474	2439	3387	436	8993	6131	481	2453	57775
32	**49H6**	594	22581	1440	1798	244	4860	3479	304	1303	36603
30	**50G8**	0	71	19	34	12	64	31	4	22	257
30	**50G9**	0	0	1	3	2	10	6	1	5	27
30	**50H0**	3	33	25	46	18	110	61	8	43	346
30	**51G7**	0	259	70	117	34	178	77	9	45	789
30	**51G8**	0	26	14	28	10	60	30	3	25	195
30	**51G9**	0	1	0	0	0	0	0	0	0	1
30	**51H0**	0	37	17	31	11	67	35	4	26	229
30	**52G8**	0	0	0	0	0	0	0	0	0	0
30	**52G9**	0	405	352	716	302	1833	996	116	978	5698
30	**52H0**	2	334	220	450	196	1224	685	83	648	3841
30	**53G8**	0	66	117	212	77	464	241	28	158	1362
30	**53G9**	0	2	4	7	3	17	9	1	8	51
30	**53H0**	0	65	17	34	17	125	74	8	76	416
30	**54G8**	0	0	0	0	0	0	0	0	0	0
30	**54G9**	0	23	14	28	12	82	46	5	45	255
30	**54H0**	0	23	33	63	25	161	86	9	94	494
30	**55G9**	0	41	20	43	22	147	85	10	134	503
30	**55H0**	0	131	220	423	160	970	515	62	421	2901

Table 13. Survey statistics for Bothnian Sea herring SD 30 calculations (StoX) in 2025. The species composition is based on trawl catches.

ICES SD	ICES Rect.	NM	Area (nm^2)	Sa (m^2/nm^2)	Herring (%)	Sprat (%)	Cod (%)	3-spinn. (%)
30	50G8	30	859,6	446	96,66	1,33	0,00	1,96
30	50G9	57	885,7	247	28,09	0,07	0,00	71,82
30	50H0	17	839,2	366	46,67	1,06	0,00	52,21
30	51G7	18	671,0	988	93,68	3,00	0,00	3,24
30	51G8	79	871,7	556	96,61	0,75	0,00	2,56
30	51G9	63	872,0	121	64,09	0,02	0,00	35,84
30	51H0	47	872,0	212	48,76	1,15	0,00	49,66
30	52G8	59	858,2	553	99,10	0,00	0,00	0,71
30	52G9	62	858,2	405	59,98	23,81	0,00	15,10
30	52H0	63	858,2	226	37,14	18,43	0,00	43,52
30	53G8	62	844,2	226	77,09	11,84	0,00	10,85
30	53G9	69	844,3	178	70,11	0,45	0,00	29,32
30	53H0	73	844,3	301	95,20	2,78	0,00	1,11
30	54G8	18	659,2	169	94,57	0,00	0,00	4,61
30	54G9	77	830,3	249	94,62	2,15	0,00	1,82
30	54H0	43	734,1	794	97,28	1,30	0,00	1,00
30	55G9	22	658,4	432	96,37	2,85	0,00	0,45
30	55H0	47	744,5	583	87,07	11,07	0,00	1,70

Table 14.Numbers (millions) of herring by age in SD 30 (r/v Aranda 2025).

Rect/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
50G8	6,69	144,55	210,95	225,72	64,84	292,75	118,25	197,99	150,41	4,48	15,59	4,58	2,25	2,14	0,00	2,14	1443,34
50G9	28,08	227,01	208,29	107,66	37,45	25,74	11,70	28,08	18,72	9,36	0,00	0,00	0,00	0,00	0,00	0,00	702,10
50H0	22,52	690,50	210,15	93,82	33,77	30,02	41,28	41,28	18,76	7,51	7,51	3,75	0,00	0,00	0,00	0,00	1200,86
51G7	15,80	213,36	497,85	363,51	118,54	395,12	300,29	331,90	79,02	23,71	23,71	0,00	0,00	0,00	0,00	0,00	2362,81
51G8	19,80	298,95	358,92	360,90	144,89	261,24	215,65	97,80	61,08	2,89	5,72	0,00	0,00	0,00	0,00	0,00	1827,83
51G9	5,87	21,02	41,75	85,86	93,05	25,74	68,28	12,52	5,38	10,75	1,80	0,00	0,00	0,00	0,00	0,00	372,03
51H0	161,09	90,05	118,03	120,11	70,23	44,85	53,02	23,23	1,05	27,47	1,07	3,14	1,05	1,05	0,00	1,12	716,56
52G8	11,34	153,08	527,28	419,55	306,16	79,38	124,73	96,38	45,36	0,00	5,67	0,00	0,00	0,00	0,00	5,67	1774,60
52G9	0,00	81,45	217,64	260,78	83,03	159,46	63,08	54,77	54,78	14,95	9,96	3,32	3,32	1,66	3,32	0,00	1011,53
52H0	50,42	154,39	46,15	59,08	38,52	13,19	62,37	73,93	5,53	5,51	5,51	1,57	3,97	0,00	0,00	0,81	520,96
53G8	1,01	19,29	169,05	52,00	63,22	64,25	168,27	40,79	12,23	7,13	3,07	5,11	1,03	2,04	0,00	1,02	609,50
53G9	32,39	30,92	221,80	95,10	35,08	35,99	36,03	46,39	3,48	9,64	1,71	1,70	0,00	0,00	0,00	1,73	551,94
53H0	9,15	149,27	261,69	171,64	154,45	52,88	137,65	15,42	24,51	7,64	0,00	3,04	1,49	0,00	0,00	0,00	988,84
54G8	0,00	5,93	86,54	110,25	52,16	61,64	43,86	21,34	4,74	10,67	4,74	1,19	2,37	1,19	0,00	0,00	406,61
54G9	1,27	120,19	230,28	165,83	70,32	124,33	35,17	17,60	5,05	5,03	1,25	1,25	0,00	1,26	0,00	1,26	780,07
54H0	0,00	1048,49	962,81	252,94	36,72	36,72	89,75	77,51	16,32	4,08	12,24	0,00	8,16	4,08	0,00	4,08	2553,91
55G9	0,00	90,58	505,16	195,09	94,06	94,06	69,68	59,23	13,94	6,97	3,48	3,48	0,00	0,00	0,00	3,48	1139,21
55H0	10,94	513,97	459,29	284,32	10,94	125,76	142,16	82,02	38,27	38,27	0,00	0,00	0,00	0,00	0,00	0,00	1705,93

Table 15.Total biomass (ton) of herring by age in SD 30 (r/v Aranda 2025).

Rect/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	Total
50G8	76	2361	4467	5874	1921	10809	4405	7626	6238	235	702	293	112	140	0	160	45419
50G9	96	3831	4844	2722	990	711	375	937	617	322	0	0	0	0	0	0	15446
50H0	83	11657	4734	2415	1042	935	1223	1369	737	224	305	152	0	0	0	0	24875
51G7	162	3664	10659	9533	4240	13353	10910	12339	3140	1321	1217	0	0	0	0	0	70536
51G8	128	4938	8264	9257	4768	9368	8368	4219	3044	161	326	0	0	0	0	0	52841
51G9	26	391	959	2335	2657	892	2601	424	196	387	75	0	0	0	0	0	10943
51H0	624	1528	2662	3057	1966	1471	1810	867	43	923	47	157	52	52	0	51	15311
52G8	26	2861	12362	11312	8908	2840	4678	3919	1760	0	236	0	0	0	0	279	49181
52G9	0	1537	4612	7908	2502	4904	2348	2123	2236	548	470	141	147	84	192	0	29753
52H0	225	2621	1111	1510	1294	455	2377	2110	265	262	298	74	259	0	0	53	12914
53G8	4	366	3931	1387	1963	2234	6116	1621	531	332	163	233	66	145	0	55	19147
53G9	123	589	6076	2746	1082	1209	1399	1719	149	429	91	93	0	0	0	79	15783
53H0	36	2373	5615	4664	4876	1689	5174	644	925	330	0	130	85	0	0	0	26541
54G8	0	116	1902	2693	1569	1930	1528	779	179	346	230	63	114	64	0	0	11513
54G9	14	2158	5442	4668	2130	4099	1171	645	227	197	77	64	0	61	0	61	21013
54H0	0	17494	22500	7281	1083	1202	3146	2937	782	139	503	0	357	179	0	310	57915
55G9	0	1604	11195	5368	2986	2647	2257	1924	519	308	185	178	0	0	0	223	29392
55H0	38	8129	10130	6895	344	3616	4445	2387	1253	1183	0	0	0	0	0	0	38419

Table 16. Mean weight (g) of herring by age in SD 30 (r/v Aranda 2025).

Rect/Age	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15+	MeanAll
50G8	11,43	16,34	21,18	26,02	29,63	36,92	37,25	38,52	41,47	52,50	45,03	63,90	49,50	65,50		74,50	31,47
50G9	3,41	16,88	23,25	25,28	26,45	27,62	32,04	33,37	32,98	34,45							22,00
50H0	3,67	16,88	22,53	25,74	30,86	31,14	29,62	33,15	39,28	29,80	40,60	40,60					20,71
51G7	10,25	17,17	21,41	26,22	35,77	33,79	36,33	37,18	39,73	55,73	51,33						29,85
51G8	6,44	16,52	23,02	25,65	32,91	35,86	38,80	43,14	49,84	55,80	56,90						28,91
51G9	4,46	18,59	22,97	27,20	28,55	34,66	38,09	33,85	36,38	36,00	41,83						29,41
51H0	3,88	16,97	22,55	25,45	28,00	32,80	34,14	37,33	41,00	33,58	44,30	50,17	49,50	49,50		46,00	21,37
52G8	2,30	18,69	23,45	26,96	29,10	35,79	37,50	40,66	38,80		41,60					49,20	27,71
52G9		18,88	21,19	30,32	30,13	30,75	37,21	38,76	40,82	36,69	47,18	42,45	44,20	50,60	58,00		29,41
52H0	4,46	16,98	24,07	25,56	33,59	34,51	38,11	28,55	48,00	47,51	54,14	47,00	65,16			65,30	24,79
53G8	3,50	18,98	23,25	26,68	31,05	34,77	36,34	39,73	43,44	46,51	53,20	45,64	64,50	71,15		54,40	31,41
53G9	3,79	19,04	27,39	28,87	30,86	33,58	38,83	37,05	42,93	44,47	53,40	54,65				45,90	28,60
53H0	3,92	15,90	21,46	27,17	31,57	31,95	37,59	41,78	37,75	43,14		42,65	57,00				26,84
54G8		19,52	21,98	24,43	30,07	31,31	34,84	36,51	37,70	32,46	48,58	53,50	48,00	54,00			28,31
54G9	11,00	17,95	23,63	28,15	30,29	32,96	33,29	36,66	45,05	39,23	62,00	51,00		48,50		48,50	26,94
54H0		16,69	23,37	28,79	29,49	32,74	35,05	37,89	47,95	34,00	41,13		43,80	43,80		76,00	22,68
55G9		17,70	22,16	27,51	31,74	28,14	32,39	32,48	37,23	44,15	53,00	51,00				64,00	25,80
55H0	3,50	15,82	22,05	24,25	31,45	28,76	31,27	29,10	32,74	30,90							22,52

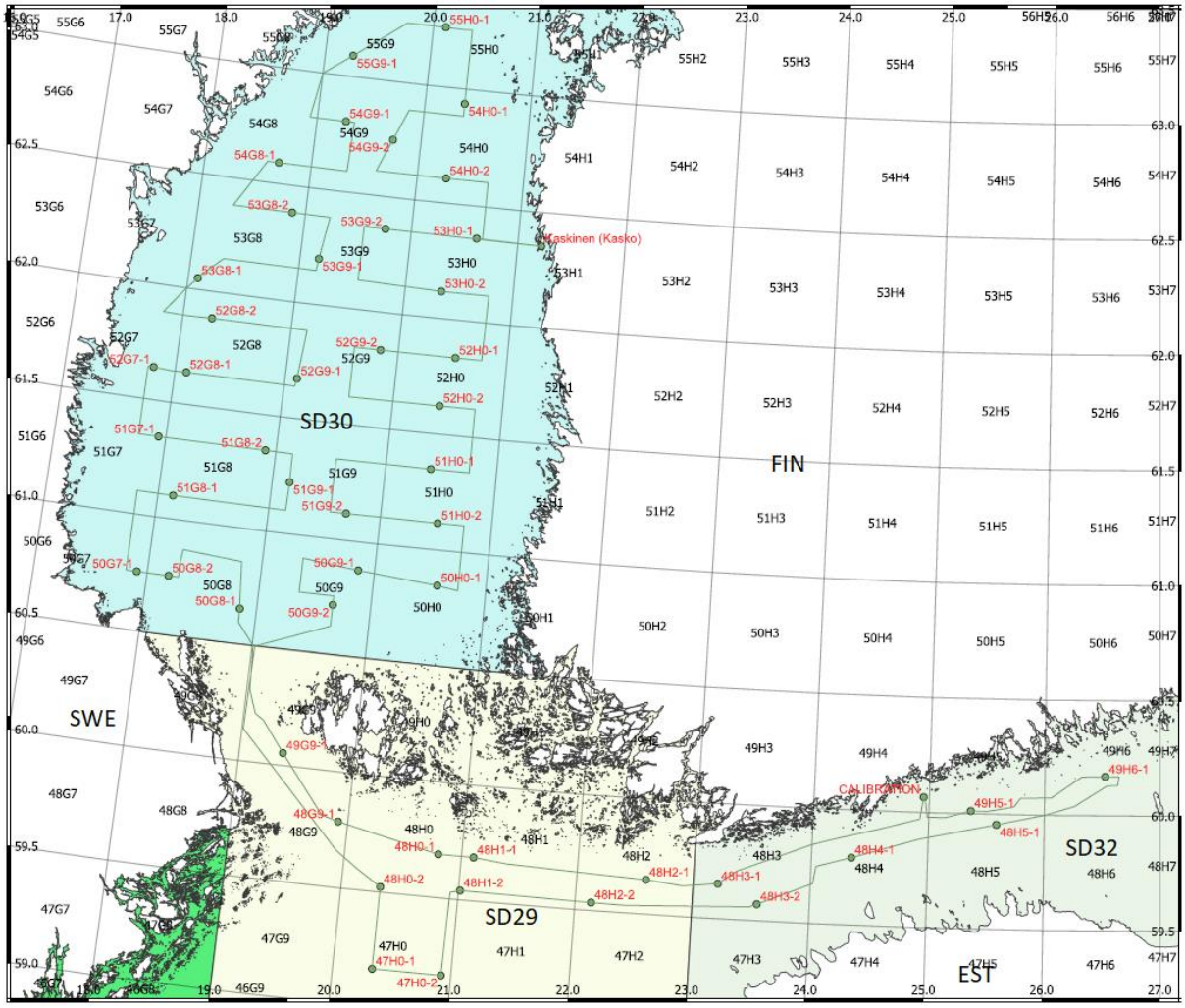

Figure 1. Planned cruise track and trawl stations of r/v Aranda during the Finnish BIAS-survey in 2025.

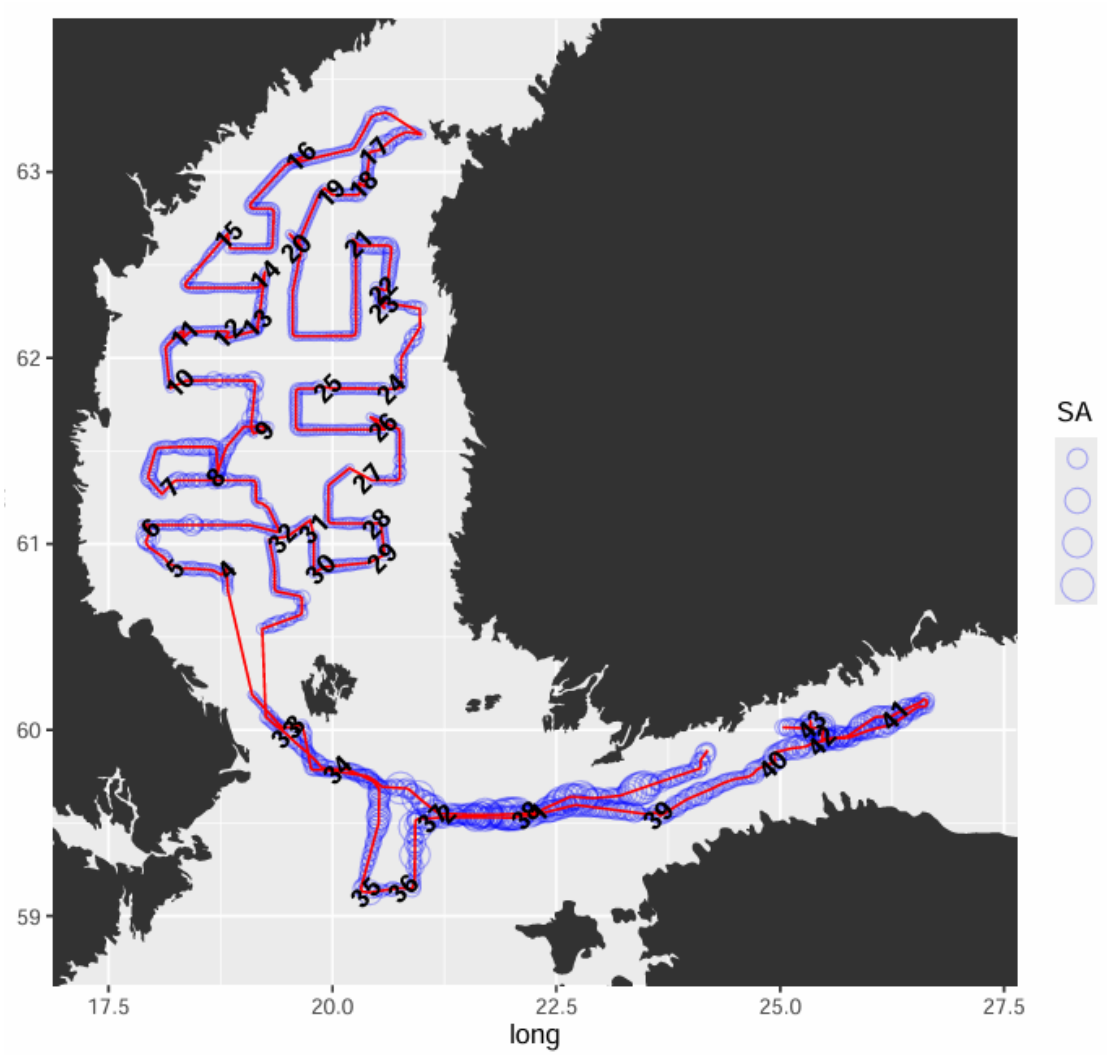

Figure 2. Realized cruise track and trawl stations of r/v Aranda during the Finnish BIAS-survey in 2025.

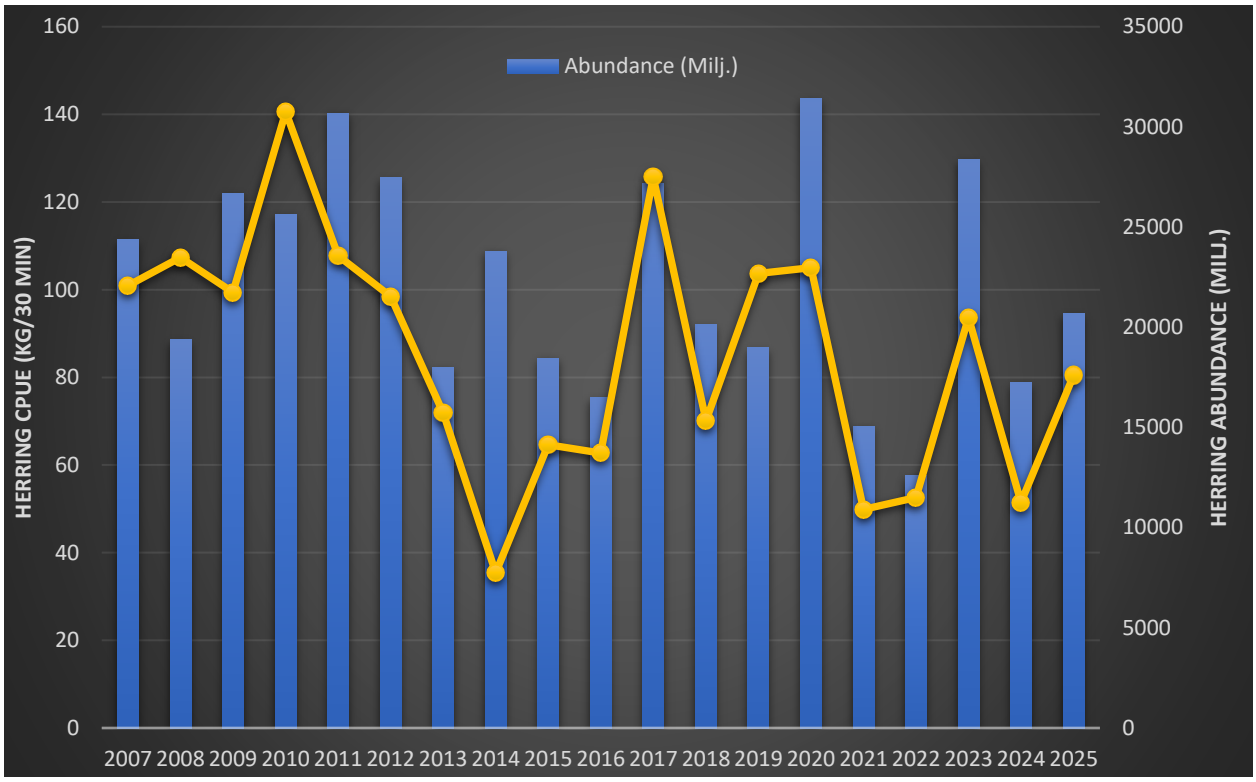

Figure 3. Abundance of herring in SD 30 from 2007 to 2025 with StoX calculations and CPUE (kg/30 min) of herring caught by Fotö-trawl.