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REPORT OF THE

BALTIC INTERNATIONAL FISH SURVEY WORKING GROUP

ICES Headquarters
3–7 April 2000

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International Council for the Exploration of the Sea

Conseil International pour l’Exploration de la Mer

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1.1 Participation

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Tiit Raid	Estonia
Faust Shvetsov	Latvia
Ivo Sics	Latvia
Yvonne Walther	Sweden

1.2 Terms of Reference

According to Annual Science Conference Resolution in Stockholm last year the Baltic International Fish Survey Working Group [WGBIFS] (Chair: E. Aro, Finland) will meet at ICES Headquarters from 3–7 April 2000 to:

a) combine and analyse the results of the 1999 acoustic surveys;

b) correct errors in and update the hydroacoustic database BAD1 for the years 1991 to 1999;

c) plan and decide on acoustic surveys and experiments to be conducted in 2000 and 2001;

d) update, if necessary both Baltic International Trawl Survey (BITS) and Baltic International Acoustic Survey (BIAS) manuals;

e) continue the comparison and analysis of results from concurrent survey activities by the traditional and the new standard trawls;

f) plan experiments to evaluate the biological sampling and TS conversion formulas presently applied in the Baltic during hydroacoustic surveys;

g) continue to establish a new acoustic database BAD2;

h) provide information on distribution of juvenile herring, sprat and undersized cod taken in small mesh fishery (including distribution maps);

Some of the above Terms of Reference are set up to provide ACFM with information required to respond to requests for advice/information from the International Baltic Sea Fishery Commission and Science Committees.

WGBIFS will report to WGBFAS, and to the Baltic and Resource Management Committees at the 2000 Annual Science Conference.

The main objective of the WGBIFS is to co-ordinate and standardise national research surveys in the Baltic for the benefit of accurate resource assessment of Baltic fish stocks. From 1996 to 1999 attention focused on evaluations of traditional surveys, introduction of survey manuals and considerations of sampling design and standard gears as well as co-ordinated data exchange format. Future activities will be devoted to development of new standard gears for demersal surveys, biological sampling regimes and analysis of both demersal and acoustic trawl survey results. During 1999 some national surveys adopted the new standard demersal gear (TV3-trawl) for surveys in the Baltic. However, practical tests are required to optimise gear behaviour and rigging as well as to calibrate research vessels in order to obtain relevant assessment data in time for the WGBFAS. These activities were initiated in 1999 under the umbrella of European Union project ISDBITS.

Dissolving the Study Group on Baltic Acoustic Data (SGBAD) has increased the tasks of the working group and in practice WGBIFS has continued some of the SGBAD activities in analysing acoustic survey data for Baltic Fisheries Assessment Working Group and developing further hydroacoustic database and plan and decide on acoustic surveys and experiments to be conducted in the future. The quality assurance will require achievements towards a fully agreed calibration of processes and internationally agreed standards. (C.Res.1999/2:61).

1.3 Overview

The WGBIFS activities was initiated in 1996 to promote co-ordination and standardisation of national research surveys in the Baltic (ICES CM 1995/J:1). The first Working Group meeting (ICES CM 1996/J:1) considered the design of trawl surveys for cod assessment, established a bottom trawl manual and outlined problems in hydroacoustic surveys. The second meeting (ICES CM 1997/J:4) gave advice on intercalibration between research vessels, described sampling protocols of sprat and flounder and evaluated historical data from hydroacoustic investigations on herring. Both meetings dealt with the introduction of modern standard bottom trawls for resource surveys in the Baltic. Expertise advise on the choice of standard trawls has been provided by two gear workshops (ICES CM 1997/J6; 1998/H:1). The third meeting (ICES CM 1998/H:4) adopted the recommendation on standard trawls for Baltic International Fish Surveys. They also made a plan intercalibration programmes for the introduction of new standard gears. They also evaluated the continuation of existing survey practice, optimised the sampling procedures for both cod and other target species including a critical inventory of the current coding procedures for maturity stages and reviewed the effects of biological sampling and TS conversion formulas on the results of acoustic stock levels and biomass estimates. The meeting also finalised and updated the Manual for Baltic International Acoustic Surveys (BIAS) based on a draft made by the Study Group on Baltic Acoustic Data (SGBAD). The fourth meeting (ICES CM 1999/H:2) propose detailed protocols on fishing methods, sampling, report formats, etc. for trawl surveys in the Baltic in order to implement a quality assurance to the Baltic International Trawl Survey (BITS). It also preliminary compared the results from concurrent survey activities by the traditional and the new standard trawls and planned intercalibration programmes. WGBIFS has established an acoustic database BAD2 (including the information on Elementary Sampling Distance Unit (ESDU) and biological sampling) which should replace the existing database BAD1. This process is still going on. In recent years a number of new scientific projects and study projects has been initiated in the Baltic and neighbouring areas, and these activities are supporting WGBIFS in many ways. The TORs of WGBIFS this year were closely linked to these projects funded by European Commission. Thus it was considered appropriate to organise also this year a coordination meeting of two projects during the Working Group meeting.

EU-Study Projects, which had their coordination meetings in Copenhagen were:

1. **ISDBITS**-project: "Implementation and calibration of standard survey trawls and standardisation of survey design of the Baltic international bottom trawl surveys for fishery resource assessment" co-ordinated by J. Rasmus Nielsen (Hirtshals, Denmark)

2. **BITS**-project: "Establishing a Baltic Trawl Survey (BITS) database" co-ordinated by Yvonne Walther (Karlskrona, Sweden).

BALTDAT-project: "Surveying the pelagic fish resources and establish an acoustic database in the Baltic Sea"-coordinated by Fredrik Arrhenius (Lysekil, Sweden) had their meeting in Lysekil and their report is shown in Annex 1.

2 RESULTS OF THE 1999 ACOUSTIC SURVEYS

In 1999 the following acoustic surveys were conducted during the time period September/October:

Vessel	Country	Sub-division
ARGOS	Sweden	27(parts 25,26,28,29S
ATLANTIDA	Russia, Latvia	26,28
BALTICA	Poland	25,26 (parts 24)
SOLEA	Germany, Denmark	22,23,24 (parts21)
JULANTA	Estonia, Finland	29N,30,31,32

The results from the individual vessels are found in the database BAD1.

2.1 R/V ARGOS

The Swedish R/V Argos carried out an acoustic survey 991004-991022 in ICES Subdivision 27 and parts of Subdivisions 24, 25, 26, 28 and 29S.

The equipment used was an SIMRAD EK500 echo sounder and the BEI (Bergen Echo Integrator) system. A hull mounted 38 kHz split beam transducer was used. Integration and fishing was performed around the clock. Samples of fish were taken from the trawl catches to estimate species composition and length-frequency distribution of target species. For this purpose a Macro 4 midwater trawl was used with a vertical opening of 17-22 m and a stretch mesh size of 21 mm in the codend. This year a new pair of trawl doors (Dangren) was used, with an area of 5.3 m^2 and weight of about 950 kg. The trawling speed was 3-4.5 knots, and haul duration 30-60 minutes. Totally 36 trawl hauls were made. Four hauls were excluded in the analysis.

The hydroacoustic equipment was calibrated directly before the survey against a standard copper sphere at a calibration site at Högön, Västervik.

The survey covered 16 130 NM^2. The survey grid and position of the trawl hauls are shown in Figure 2.1.1.

The acoustic energy was allocated to species based on the catch composition in the hauls and converted to number per length group using following target strength regressions

for clupeoides

TSind.= 20.0 log L(cm) - 71.2 dB

for gadoids

TSind.= 20.0 log L(cm) - 65.7 dB

and for fish without swim bladder

TSind.= 20.0 log L(cm) - 77.2 dB

where L is the fish length in cm.

Salmonids and 3-spined stickleback were assumed to have the same acoustic properties as herring.

2.2 R/V ATLANTIDA

Russian and Latvian scientists carried out an acoustic survey aboard R/V "ATLANTIDA" in Subdivisions 26 and 28 from 3 October – 21 October 1999. The integration covered 15907 square nautical miles and the integrated track was 1150 nautical miles.

The survey grid and position of the trawl hauls are shown in Figure 2.2.1

The hydroacoustic equipment used was SIMRAD EK-500 echosounder working at 38kHz and the echointegrator system BI-500. The working speed of the vessel was 8 knots. The trawling speed was 4.2 knots. The integration interval was 1 nautical mile

The equipment was calibrated against a standard copper sphere in Bogen Fjord, Norway by a specialist of SIMRAD, A KONGSBERG Company in June 1999. The integration and hauling were made during the daytime.

R/V "ATLANTIDA" used the midwater trawl RT/TM 70/300 with a vertical opening 28-32 m and bar length in the codend of 6.5 mm. Totally 55 sample hauls were made.

The backscattered energy was allocated to species on the basis of the catch and its length composition, using the following target strength regression for clupeoids:

TS = 20.0 LogL(cm) – 71.2dB.

2.3 R/V BALTICA

The Polish acoustic survey was carried out by R/V BALTICA in the Polish EEZ in Sub-divisions 24, 25 and 26 from 5-21 October, 1999.

The acoustic measurements were conducted both during day and night with EY500 sounder and stored on HDD for time intervals corresponding to a distance of 1 NM (ESDU=1 NM). The working speed of the vessel was 4-8 knots. The calibration was carried out during the cruise by SIMRAD (Bogen, Norway) in 1998.

A modified midwater trawl WP53/64x4 with 11 mm bar length in the codend was used to collect biological samples. The trawling speed was 3-4 knots, and haul duration 30-60 minutes.

Fish numbers were estimated using the TS-LENGTH regressions:
clupeoids: TS = 20logL-71.2
gadoids: TS = 20logL-67.5

Total number of fish was divided into species and age groups according to the species and age composition of the catch. ALKs were made for each Sub-division for sprat and herring.

Data: 1121 ESDU; 26 hauls; herring - length 26 samples (5343 ind.), age 23 samples (1195 ind.); sprat length 26 samples (4034 ind.), age 14 samples (750 ind.). Quality of data was significantly limited by heavy weather conditions.

Acoustic track and trawl stations are presented in Figure 2.3.1.

2.4 R/V SOLEA

A joint German-Danish acoustic survey was carried out with R/V “SOLEA” from 25 September–16 October 1999 in the Western Baltic. The survey covered ICES Sub-divisions 22, 23, 24 and the southern part of the Kattegat. All investigations were performed during night-time as in previous years.

The acoustic equipment used was an EK500 Echo sounder connected to the BI500 Bergen-Integrator. A 38kHz transducer 38-26 was deployed in a towed body. The towed body had a lateral distance of about 30 m to reduce escape reactions of fish.

The length of the cruise track was 896 NM, like last year. A total of 45 trawl hauls were carried out for target identification. From each haul samples were taken for the determination of length, weight and age of fish. The hydrographic conditions were recorded after the haul using a CTD probe.

The measured SA values for each stratum were converted into fish numbers using the TS-length regressions:

Clupeids TS= 20 log L [cm] –71.2 [dB]

Gadoids TS= 20 log L [cm] –67.5 [dB]

Cruise track and trawl positions are given in Figure 2.4.1.

The total abundance of herring was nearly twice as much compared to 1998. The main part was juvenile herring and only few of adult herring was found therefore the total biomass was comparable to the 1998 results.

Also for sprat the abundance was nearly twice the last years estimate with a high percentage of 0-group.

2.5 R/V JULANTA

A joint Finnish-Estonian acoustic survey was carried out with Finnish R\V “Julanta” from 26 September to 28 October 1999 in the Northern Baltic. The vessel has a total length of 27 m and propulsion power 750 kW. The survey covered ICES Sub-divisions 30, 31, 32 and northern part of 29. Estonian Marine Research Institute was responsible for the part of the survey carried out from 22 to 28 October 1999 in the Gulf of Finland (Sub-division 32) and Finnish Game and Fisheries Research Institute was responsible for the survey on the other areas.

The acoustic equipment was a SIMRAD EY500 portable sounder system. A 38 kHz split beam SIMRAD ES38-12 transducer was deployed in a towed body. The hydroacoustic equipment was calibrated immediately before the survey near Russarö Island, Hanko, Southwest Finland, using the standard copper sphere with 60 mm diameter. Studies on this survey were performed mainly during night-time. The area back-scattering strength was averaged over 1 nautical mile intervals. The hydrographic conditions were recorded after each haul using a CTD probe. The fish samples were taken with a commercial mid-water trawl (type Finflyder combi). The trawl has a vertical opening of ca. 25 m and the cod-end mesh size 22 mm (stretched mesh).

On subdivisions 29N, 30 and 31 the studies were conducted from 26 September to 21 October 1999. The length of the survey track was 1237 NM. Altogether 32 trawl hauls were made (4 hauls on SD29N, 22 on SD30 and 6 on SD31). The fishing speed was ca. 2.5-2.9 knots and the duration of each haul was ca. 30 min. Length frequencies of the catches were determined measuring total length of 12190 fish, of which 7489 were herring and 2867 sprat. On the subdivisions 29N-31 837 herring and 253 sprat were aged.

On the Gulf of Finland the length of the survey track was 269 NM and integration covered 5951 square nautical miles. Altogether, 10 trawl hauls were made in the Gulf of Finland. The trawling speed was 2.4 - 2.8 knots and the duration of each was 29-39 minutes. For age-length keys 1934 herrings and 2188 sprats were measured and 213 herrings and 125 sprats were aged.

The TS-length conversion was done using the equation TS = 20logL-71.2, where L is the fish length in cm. The same TS-length equation was assumed to be suitable for all fish.

The cruise track and trawl positions in SD 32 are given in Figure 2.5.1. and in 29N-31 in Figure 2.5.2.

2.6 Day/Night comparison

The Day/Night experiments were carried out by R/V “ATLANTIDA” from 22-23 October 1999 in SD 26. The settings of the echosounder system were the same as during the regular acoustic survey made by R/V “ATLANTNIDA”.
The experimental acoustics transect started in the position $55^0$07.7’N $20^0$13.4’E, on the depth of 47m. The end of the track was in the position $55^0$07.6’N 19^0 29.7E, on the depth of 100m. This transect was carried out during day and night.). The daylight hours – from UTC 09.00 – 14.50. The night-time experiment was performed from UTC 21.00 – 02.30. To identify the acoustic measurements 4 sample hauls were made: and 2 in the daylight hours and 2 in the night -time.

The essential results are given in Figures 2.6.1 - 2.6.4. A study of the graphs (Figures.2.6.1–2.6.2) reveals that that all values of Sa were not differ substantially during day and night. The correlation coefficient between values of Sa was rather high- 0.82.

A study of the trawl catch composition reveals that share of herring increased in the night-time independently of the depth (Figure 2.6.3).

At the shallow water (depth of 53 m) the share of small sprat in the night-time increased substantially in comparison with the daylight hours (Figure 2.6.4A). In the deeper water (depth of 98 m) the share of small sprat was stable during day and night.

The most likely explanation that the 1998 experiment results were not reproduced in 1999 despite of the typical settings of the equipment and the similar biological sampling, is the different environmental condition in 1998 and in 1999**.**

2.7 Combined results

2.7.1 Overlapping areas

During the international acoustic survey 1999 nine squares were investigated by two vessels (Table 2.7.1.1). The investigations were carried out within the time interval of some days.

For the further use of these data it was necessary to propose how these data should be used in the estimates for the ICES Sub-divisions.

For each square the following data were compared

- the covered area of the square and
- the number of hauls in the squares.

The differences between the species and length composition were being supposed as stochastic variations.

If the whole square was investigated by both vessels and the number of hauls were more than one the arithmetic mean of both data sets were used.

If the coverage of the squares were quite different or the number of hauls were zero for one vessel the handling of the data were discussed.

The Table 2.7.1.1 presents the results of this analysis. In Tables 2.7.1.2 and 2.7.1.3 you will find the abundance in numbers by rectangle for herring and sprat. Overlapping survey in rectangles is labelled grey.

2.7.2 Total results

As a summary of the results of the international acoustic survey in 1999 the Tables 2.7.2.1 to 2.7.2.4 are presented. The overlapping areas are used as described in Table 2.7.1.1.

Tables 2.7.2.1 and 2.7.2.2 give the abundance estimates for herring and sprat for ICES sub-divisions and age groups.

The biomass estimates are presented in Tables 2.7.2.3 and 2.7.2.4 for herring and sprat. These data are also presented by ICES sub-divisions and age groups.

The WGBIFS recommends that the data from 1999 can be used for the estimation of the herring and sprat stocks. For a comparison of the estimation of different years it seem to be better to use the acoustic estimates as index values in number per NM^2.

The following estimations of the acoustic survey in the Baltic Sea area must be regarded with care:

- Estimation of the herring 2+ age group in Subdivisions 22, 23 and 24. It is known from tagging experiments that in autumn older herring (2+ age group) is migrating from the feeding areas in the North Sea and Skagerrak through the Kattegat (Subdivision 21) for overwintering in the Sound (Subdivision 23) to the main spawning grounds around Rügen, reaching this area during spring time. Since the corresponding acoustic survey is not covering the whole area at the same survey time (excluding the Skagerrak and northern Kattegat area, respectively), the older herring (2+ age group) may be underestimated.

- Estimation of the young herring and young sprat in the eastern Baltic Sea (Sub-divisions 25-32). The young herring and sprat stay partly in the shallow water of the eastern Baltic Sea. These areas can not be investigated with the used vessels. Therefore the portion of theses groups is unknown.

- The obtained biomass estimates in northern Baltic (Sub-divisions 29N-31) were very low in all surveyed subdivisions compared for example with the annual catches. The coverage of the cruise was not satisfactory in all areas especially due to unfavourable weather conditions. Obviously, large proportions of the fish stock were in shallow areas near the coasts and archipelagos. Therefore, the acoustic data is not suitable for assessment purposes on these areas.

Table 2.7.1.1. Treatment of data from rectangles with overlapping.

Square	Vessel A	Sa values	Number of trawls	Vessel B	Sa values	Number of trawls	Suggestion
38G4	Solea	NE part	1	Baltica	S part	2	Arithm. mean
39G5	Argos	N part	4	Baltica	S part	1	Arithm. mean
39G6	Argos	N part	2	Baltica	S part	2	Arithm. mean
40G7	Argos	Whole area	1	Baltica	Small part in S	1	Argos data
38G9	Baltica	E part	3	Atlantida	Whole area	3	Arithm. mean
39G9	Baltica	Small part in W	4	Atlantida	Whole area	4	Atlantida data
41G8	Argos	Whole area	0	Atlantida	Whole area	3	Atlantida data
42G8	Argos	Whole area	1	Atlantida	E part	3	Arithm. mean
45G9	Argos	Whole area	2	Atlantida	E part	3	Arithm. mean

Table 2.7.1.2 Estimated numbers (millions) of herring October 1999 by rectangle

SD	Rect	total	age 0	Age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	41G1	164	152	10	1	0	0	0	0	0	0
21	41G2	45	38	6	0	0	0	0	0	0	0
21	42G1	441	437	4	0	0	0	0	0	0	0
21	42G2	358	276	72	8	0	2	0	0	0	0
21	43G1	2328	2328	0	0	0	0	0	0	0	0
21	43G2	49	48	0	0	0	0	0	0	0	0
22	37G0	238	188	50	0	0	0	0	0	0	0
22	37G1	1430	1021	367	29	9	1	1	3	0	0
22	38G0	754	649	99	4	1	0	0	1	0	0
22	38G1	416	399	17	0	0	0	0	0	0	0
22	39F9	83	82	1	0	0	0	0	0	0	0
22	39G0	98	94	5	0	0	0	0	0	0	0
22	39G1	311	290	21	0	0	0	0	0	0	0
22	40G0	85	57	26	1	0	0	0	0	0	0
23	40G2	687	299	175	55	91	45	19	2	1	1
23	41G2	7	6	1	0	0	0	0	0	0	0
24	37G2	197	180	8	3	3	2	1	0	0	0
24	37G4	996	27	238	291	26	65	349	0	0	0
24	38G2	745	679	31	13	12	7	2	0	0	0
24	38G3	404	374	16	5	4	3	1	0	0	0
24	38G4	191	15	68	34	10	19	44	0	0	0
24	39G2	425	241	42	39	59	32	11	1	0	0
24	39G3	496	135	236	66	20	29	9	1	0	0
24	39G4	587	257	210	69	16	28	6	1	0	0
25	37G5	423	26	53	116	32	61	77	33	17	8
25	38G5	581	31	82	162	42	85	106	43	22	9
25	38G6	738	31	71	208	68	113	132	60	35	20
25	38G7	229	16	24	64	20	33	40	17	10	5
25	39G5	353	25	51	88	36	68	49	21	10	5
25	39G6	483	22	57	131	55	99	74	24	14	8
25	39G7	559	67	91	131	36	81	95	33	17	7
25	40G4	291	109	73	49	22	12	23	1	2	0
25	40G5	458	62	190	82	37	56	21	5	5	0
25	40G6	395	8	12	80	77	118	73	22	4	1
25	40G7	11	1	0	2	0	4	2	1	0	0
25	41G6	421	0	6	50	81	93	112	39	28	11
25	41G7	278	3	5	49	36	137	42	5	1	0
26	37G8	47	35	5	2	1	2	1	0	0	0
26	37G9	73	46	10	6	2	4	4	1	0	0
26	38G8	343	87	64	62	25	40	42	11	7	4
26	38G9	467	162	75	70	27	44	40	21	18	12

Table 2.7.1.2 Continued

SD	Rect	total	age 0	Age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
26	39G8	643	2	88	188	82	93	118	36	24	12
26	39G9	74		4	10	10	11	17	7	6	9
26	39H0	464	237	91	41	19	12	16	19	11	18
26	40G8	643	1	144	183	69	94	108	25	14	5
26	40G9	302		6	21	14	34	89	55	39	43
26	40H0	225	3	8	29	29	33	42	27	25	29
26	41G8	576		2	31	41	75	189	107	54	77
26	41G9	300		1	11	21	46	89	54	31	47
26	41H0	148		13	20	18	20	25	22	13	15
27	42G7	264	2	5	46	34	130	40	4	1	0
27	43G7	649	0	17	143	56	251	138	30	5	9
27	44G7	295	1	54	124	38	48	25	5	0	0
27	44G8	35	1	4	16	7	6	1	0	0	0
27	45G7	418	0	99	153	23	64	69	10	0	0
27	45G8	136	1	0	26	2	71	28	5	4	0
27	46G7	488	3	24	125	85	168	72	10	0	0
27	46G8	170	2	11	92	21	23	20	0	0	0
28	42G8	203	0	0	4	16	26	77	45	21	14
28	42G9	101	0	0	4	8	23	27	18	14	6
28	42H0	554	1	5	19	43	87	168	111	72	48
28	43G9	51	0	0	2	6	7	16	10	5	4
28	43H0	136	0	3	6	14	20	42	25	16	10
28	43H1	47	24	1	3	9	3	2	3	0	1
28	44G9	55	0	0	5	4	11	18	8	5	5
28	44H0	1624	5	34	217	306	275	378	224	119	66
28	44H1	276	24	36	38	77	29	36	17	13	6
28	45G9	214	6	1	26	34	55	60	16	10	5
28	45H0	223	58	3	32	24	21	40	18	14	12
28	45H1	377	24	37	111	68	71	45	9	1	10
30	50G8	139	0	7	61	23	16	13	7	7	4
30	50G9	208	3	24	58	31	27	28	13	13	11
30	50H0	173	50	22	38	16	12	13	8	8	6
30	51G8	133	0	2	38	18	20	23	11	11	10
30	51G9	81	0	2	12	9	11	14	9	10	14
30	51H0	119	5	21	50	12	10	9	4	4	4
30	52G8	31	0	1	5	5	5	6	3	3	5
30	52G9	44	0	6	13	8	5	5	3	3	2
30	52H0	213	1	31	68	23	22	22	12	13	22
30	53G8	38	0	0	4	3	5	7	5	6	9
30	53G9	75	0	0	12	8	9	13	9	12	12
30	53H0	34	5	1	3	2	3	5	4	4	8

Table 2.7.1.2 Continued

30	54G8	114	0	1	13	10	12	17	14	18	30
SD	**Rect**	**total**	**age 0**	**Age 1**	**age 2**	**age 3**	**age 4**	**age 5**	**age 6**	**age 7**	**age 8+**
30	54G9	40	0	1	9	7	5	7	4	4	5
30	54H0	62	1	11	16	6	7	7	4	5	5
30	55G9	23	1	2	7	4	3	3	1	2	1
30	55H0	43	5	4	11	6	6	5	3	2	2
31	56H1	6	0	1	2	1	1	1	0	0	0
31	57H1	1	0	0	0	0	0	0	0	0	0
31	57H2	6	0	0	0	1	1	1	0	1	1
31	58H1	1	0	0	0	0	0	0	0	0	0
31	58H2	1	0	0	0	0	0	0	0	0	0
31	58H3	3	1	0	0	0	1	1	0	0	0
31	59H2	1	0	0	0	0	0	0	0	0	0
31	59H3	4	2	0	0	0	0	0	0	0	0
32	47H3	140	20	5	31	45	23	10	4	2	1
32	47H4	1	0	0	0	0	0	0	0	0	0
32	48H3	473	13	11	155	189	70	23	7	4	0
32	48H4	354	40	13	99	112	40	13	8	8	21
32	48H5	166	63	4	33	41	15	5	3	1	1
32	48H6	233	32	5	52	88	36	12	5	2	0
32	48H7	134	36	3	17	41	23	10	3	1	0
32	49H5	80	8	3	21	30	11	3	1	1	0
32	49H6	117	5	3	29	48	21	7	2	1	0
29N	48G9	153	1	2	43	35	34	13	9	4	12
29N	48H0	329	44	19	152	56	37	10	6	1	5
29N	48H1	299	10	22	150	64	41	10	1	1	1
29N	48H2	106	2	9	40	29	19	6	1	0	1
29N	49G8	78	0	1	22	18	18	7	5	2	6
29N	49G9	94	0	2	26	22	21	8	5	2	7
29S	46G9	177	0	5	41	30	55	40	5	0	0
29S	46H0	182	8	1	90	34	28	16	3	1	0
29S	46H1	1700	116	6	277	451	467	294	36	53	0
29S	47G9	346	0	1	202	22	58	60	1	1	0
29S	47H0	553	334	5	157	15	33	8	2	0	0
29S	47H1	495	170	9	149	57	84	24	2	0	0
29S	47H2	270	93	5	81	31	46	13	1	0	0

Table 2.7.1.3 Estimated numbers (millions) of sprat October 1999 by rectangle

SD	Rect	SUM	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	41G1	54	0	45	9	0	0	0	0	0	0
21	41G2	11	0	9	2	0	1	0	0	0	0
21	42G1	156	0	143	11	1	0	0	0	0	0
21	43G1	3	0	3	0	0	0	0	0	0	0
22	37G0	36	10	6	9	9	3	0	0	0	0
22	37G1	324	55	61	85	86	34	2	1	0	0
22	38G0	80	22	20	14	17	7	0	0	0	0
22	38G1	64	58	5	1	0	0	0	0	0	0
22	39F9	15	14	0	1	1	0	0	0	0	0
22	39G0	5	0	2	1	1	1	0	0	0	0
22	39G1	10	9	1	0	0	0	0	0	0	0
22	40G0	0	0	0	0	0	0	0	0	0	0
23	40G2	14	2	2	1	1	5	0	1	0	0
23	41G2	2	0	1	0	0	0	0	0	0	0
24	37G2	149	101	9	15	15	6	2	1	0	0
24	37G4	120	34	4	62	5	5	8	3	0	0
24	38G2	565	380	34	58	58	24	7	5	0	0
24	38G3	1592	1111	115	199	124	37	5	2	0	0
24	38G4	4772	4546	162	46	15	1	2	1	0	0
24	39G2	756	665	19	35	26	8	2	1	0	0
24	39G3	275	96	36	76	48	15	2	1	0	0
24	39G4	543	7	99	222	153	49	8	5	0	0
25	37G5	77	6	3	47	7	10	4	1	0	
25	38G5	1376	25	41	767	151	253	115	16	8	
25	38G6	197	12	7	134	14	19	9	1	1	
25	38G7	200	32	14	112	12	19	9	1	0	
25	39G5	635	33	6	322	72	89	81	14	4	32
25	39G6	1868	278	19	671	397	193	191	104	1	27
25	39G7	1551	66	54	974	141	206	92	13	5	
25	40G4	970	306	0	440	45	44	86	33	17	0
25	40G5	1436	174	0	558	130	229	212	103	21	9
25	40G6	1011	46	0	455	141	114	93	81	69	12
25	40G7	988	0	0	234	158	117	340	69	41	30
25	41G6	448	8	0	130	51	130	78	14	20	19
25	41G7	1162	5	0	282	33	335	149	75	284	0
26	37G8	868	51	49	643	85	29	9	2	0	
26	37G9	581	93	27	377	56	21	6	1	0	
26	38G8	2530	345	169	1682	227	80	22	5	0	
26	38G9	4415	703	345	2606	442	220	79	11	8	
26	39G8	892	41	48	599	111	59	26	6	1	
26	39G9	4533	174	110	2642	582	522	316	130	47	10

Table 2.7.1.3 Continued

SD	Rect	SUM	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
26	39H0	9312	3862	1517	3205	481	199	32	8	8	
26	40G8	543	0	10	333	97	61	30	10	2	
26	40G9	2059	133	59	1191	381	185	91	15	5	
26	40H0	6118	937	587	3253	676	535	118	13		
26	41G8	1188	51	1	422	55	222	282	62	39	54
26	41G9	810	25	3	431	38	103	127	36	27	22
26	41H0	7428	2884	221	3246	249	159	407	62	62	137
27	42G7	1102	4	0	268	31	318	141	71	269	0
27	43G7	1604	208	0	666	9	374	218	97	33	0
27	44G7	3199	21	0	1502	284	726	531	108	14	14
27	44G8	1481	0	0	547	245	304	346	31	9	0
27	45G7	11199	54	0	3590	2047	2181	2845	214	214	54
27	45G8	2137	10	0	903	0	400	682	141	0	0
27	46G7	7552	0	0	447	641	1548	3409	1174	157	176
27	46G8	6630	0	0	972	689	1487	2642	618	90	134
28	42G8	1548	0	12	533	180	243	435	62	39	45
28	42G9	1579	2	18	693	39	321	325	75	57	50
28	42H0	3804	376	19	2344	179	322	311	109	27	117
28	43G9	2399	0	12	1109	95	559	420	62	105	35
28	43H0	6166	948	94	3345	198	784	546	107	93	50
28	43H1	4343	2888	33	1081	16	265	38	0	22	0
28	44G9	1655	13	19	711	84	359	353	33	51	32
28	44H0	3526	45	55	1710	91	645	709	82	128	60
28	44H1	4843	2602	22	1312	74	444	260	48	40	40
28	45G9	4250	42	34	1501	210	1116	788	324	190	43
28	45H0	6594	2911	0	1348	198	881	802	94	260	101
28	45H1	6059	142	68	2670	292	1280	1121	190	173	124
30	50G8	1	0	0	0	0	1	0	0	0	0
30	50G9	11	0	1	1	1	9	0	0	0	0
30	50H0	45	0	4	4	3	34	0	0	0	0
30	51G8	8	0	0	0	0	5	0	0	1	0
30	51G9	12	0	1	1	0	10	0	0	0	0
30	51H0	71	0	3	5	2	61	0	0	1	0
30	52G8	0	0	0	0	0	0	0	0	0	0
30	52G9	2	0	0	0	0	2	0	0	0	0
30	52H0	3	0	0	0	0	3	0	0	0	0
30	53G8	1	0	0	0	0	0	0	0	0	0
30	53G9	1	0	0	0	0	1	0	0	0	0
30	53H0	16	0	0	1	0	12	0	1	2	0
30	54G8	2	0	0	0	0	1	0	0	0	0
30	54G9	1	0	0	0	0	1	0	0	0	0
30	54H0	2	0	0	0	0	2	0	0	0	0

Table 2.7.1.3 Continued

SD	Rect	SUM	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
30	55G9	0	0	0	0	0	0	0	0	0	0
30	55H0	16	0	0	1	0	14	0	0	1	0
32	47H3	43	8	0	21	8	4	2	0	0	0
32	47H4	1	0	0	0	0	0	0	0	0	0
32	48H3	1406	402	1	511	214	142	85	21	24	7
32	48H4	629	137	0	285	110	57	32	3	3	2
32	48H5	158	80	3	37	16	12	7	1	1	0
32	48H6	108	5	0	50	21	17	10	1	2	0
32	48H7	83	0	0	42	18	13	8	1	1	0
32	49H5	53	13	0	20	8	7	4	0	1	0
32	49H6	61	0	0	31	13	9	5	1	1	0
29N	48G9	2	0	0	0	0	0	1	0	0	0
29N	48H0	1640	156	12	446	148	158	648	0	55	17
29N	48H1	2394	651	9	529	171	199	746	1	74	14
29N	48H2	2556	0	3	736	230	275	1221	0	65	27
29N	49G8	1	0	0	0	0	0	1	0	0	0
29N	49G9	1	0	0	0	0	0	1	0	0	0
29S	46G9	4893	0	0	2357	94	1273	1106	39	24	0
29S	46H0	4618	0	0	1401	572	1357	982	228	78	0
29S	46H1	3394	351	0	742	398	930	410	349	214	0
29S	47G9	10319	0	0	3482	587	2690	3169	293	98	0
29S	47H0	7681	109	0	3337	517	1850	1391	204	249	22
29S	47H1	17134	404	0	7613	889	2974	4946	194	113	0
29S	47H2	9344	220	0	4152	485	1622	2698	106	62	0

Table 2.7.2.1 Estimated numbers (millions) of herring October 1999

SD	**total**	**age 0**	**age 1**	**age 2**	**age 3**	**age 4**	**age 5**	**age 6**	**age 7**	**age 8+**
21	3384	3279	93	10	0	2	0	0	0	0
22	3417	2780	586	34	9	1	2	4	0	0
23	694	305	176	55	91	45	19	2	1	1
24	4041	1909	849	521	150	186	422	3	0	1
25	5220	401	715	1211	542	960	846	305	166	75
26	4305	573	511	674	358	508	781	385	242	272
27	2453	11	215	725	268	760	392	64	10	9
28	3860	142	122	467	609	629	910	505	289	186
30	1570	72	134	416	191	175	197	111	125	151
31	22	4	1	2	3	4	5	1	1	1
32	1696	218	47	437	596	239	82	33	20	23
29N	1059	57	54	433	224	169	54	27	10	32
29S	3722	721	32	998	640	771	456	49	55	0
Total	35444	10470	3537	5984	3680	4450	4165	1490	920	750

Table 2.7.2.2 Estimated numbers (millions) of sprat October 1999

SD	**SUM**	**age 0**	**age 1**	**age 2**	**age 3**	**age 4**	**age 5**	**age 6**	**age 7**	**age 8+**
21	224	0	200	22	2	1	0	0	0	0
22	536	167	96	111	114	45	2	1	0	0
23	16	2	4	2	1	6	0	1	0	0
24	8772	6940	478	713	445	144	34	18	0	0
25	11920	991	144	5124	1352	1757	1457	524	472	128
26	41277	9301	3146	20629	3479	2396	1545	359	198	223
27	34904	297	0	8894	3945	7337	10814	2453	786	377
28	46764	9969	386	18357	1656	7220	6108	1187	1186	697
30	192	0	9	12	6	155	0	2	8	0
32	2541	646	5	997	408	261	152	29	32	10
29N	6594	806	23	1712	550	632	2616	1	195	58
29S	57384	1085	0	23085	3543	12696	14702	1413	838	22
Total	211123	30205	4490	79659	15499	32648	37431	5988	3716	1516

Table 2.7.2.3 Estimated biomass (in tonnes) of herring October 1999

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	45349	40045	4309	674	20	302	0	0	0	0
22	56646	32502	20697	2299	695	96	95	262	0	0
23	39445	3857	6945	5872	11935	6734	3391	419	146	144
24	125295	20105	30643	28265	13962	11496	20247	264	106	207
25	216955	5156	23528	53932	25008	40400	38777	15830	9231	5095
26	155516	5167	14748	26763	14510	20171	31644	16505	11459	14538
27	53555	229	545	8432	4384	17240	10216	1759	350	403
28	99615	706	2087	9750	14979	16626	25739	14574	8712	6442
30	40943	363	1742	7882	4352	4482	5749	3694	4459	8023
31	610	14	9	49	62	125	160	44	64	65
32	28808	917	597	6857	11006	4982	1868	852	573	1154
29N	20941	178	751	7483	4508	3903	1365	917	372	1477
29S	69735	3360	433	16786	13785	19445	12357	1544	2024	0
Total	953413	112600	107034	175044	119205	146003	151608	56663	37497	37547

Table 2.7.2.4 Estimated biomass (in tonnes) of sprat October 1999

SD	SUM	age 0	Age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	3744	0	3427	283	21	14	0	0	0	0
22	7683	895	1391	2057	2297	957	62	25	0	0
23	240	13	47	23	17	115	7	19	0	0
24	66038	40488	4973	10186	7136	2361	592	346	0	0
25	140410	4332	1650	59119	16428	23711	20319	7244	7608	1988
26	326174	31375	25540	185488	34001	24423	17088	4192	2357	2567
27	335646	1058	0	76622	23249	76847	118629	31423	7818	0
28	386275	31803	3212	167518	16126	71759	61874	12898	13354	7356
30	2359	0	28	126	71	1597	3	23	116	3
32	19940	2093	38	8922	3755	2686	1588	351	378	130
29N	55953	1998	158	14277	4795	6342	25564	16	2250	666
29S	550295	3656	0	200468	32672	130291	155976	17445	9787	286
Total	1894758	117709	40463	725089	140569	341102	401702	73980	43668	12996

Figure 2.1.1. Survey transects and pelagic trawl stations of R/V “Argos”, during October, 1999.

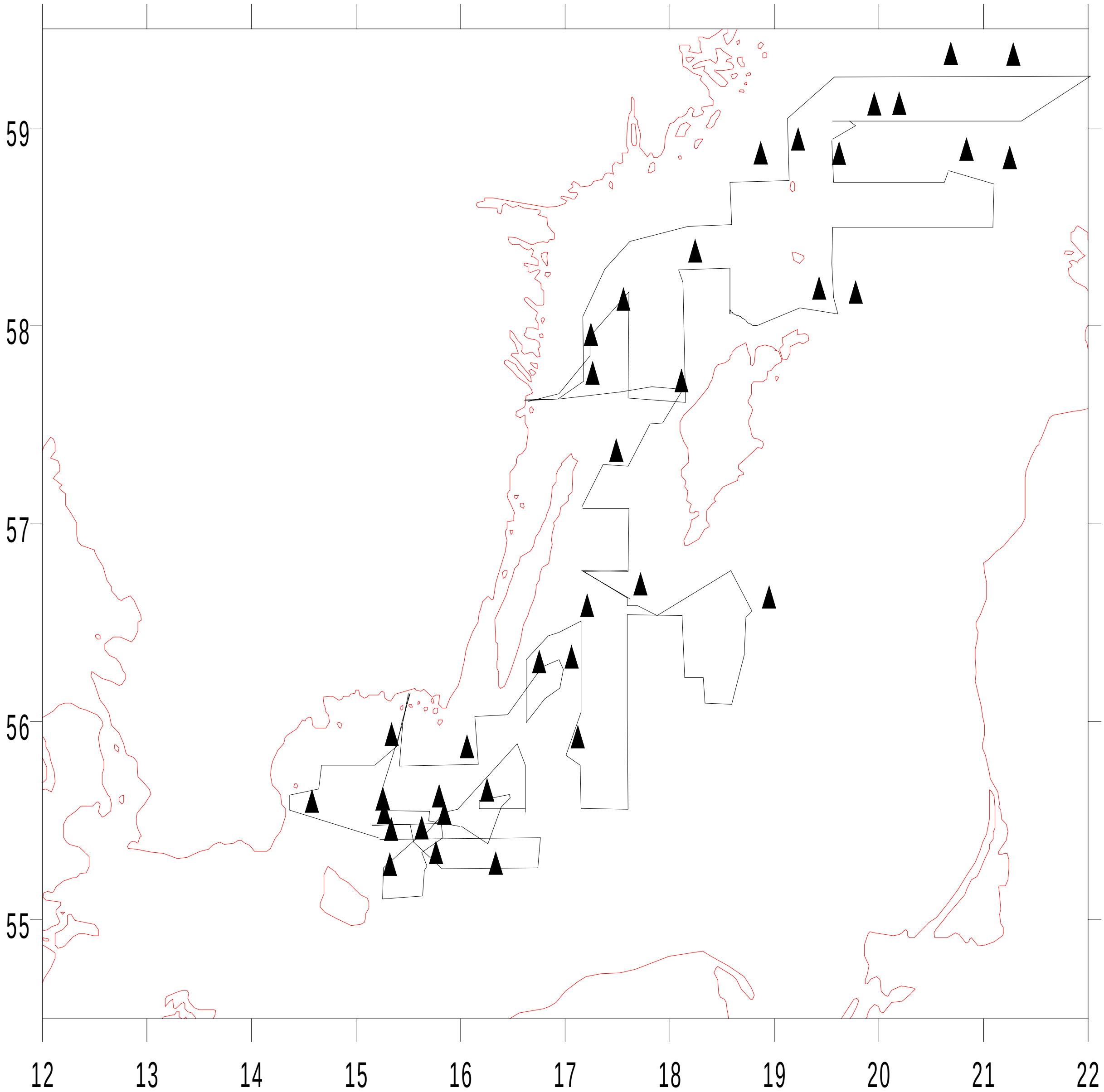


Figure 2.2.1. Cruise track and trawl stations for R/V Atlantida in October, 1999.

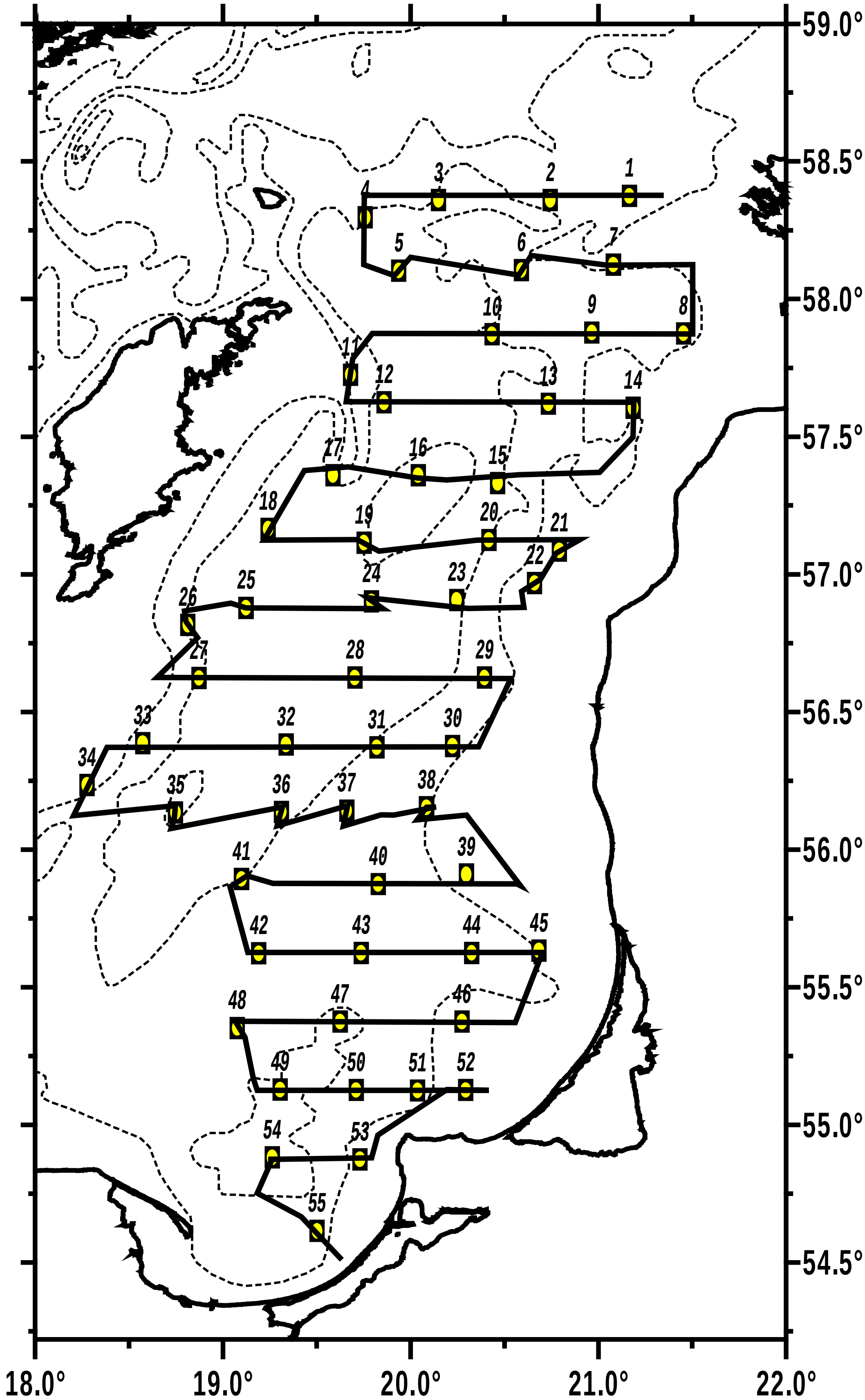
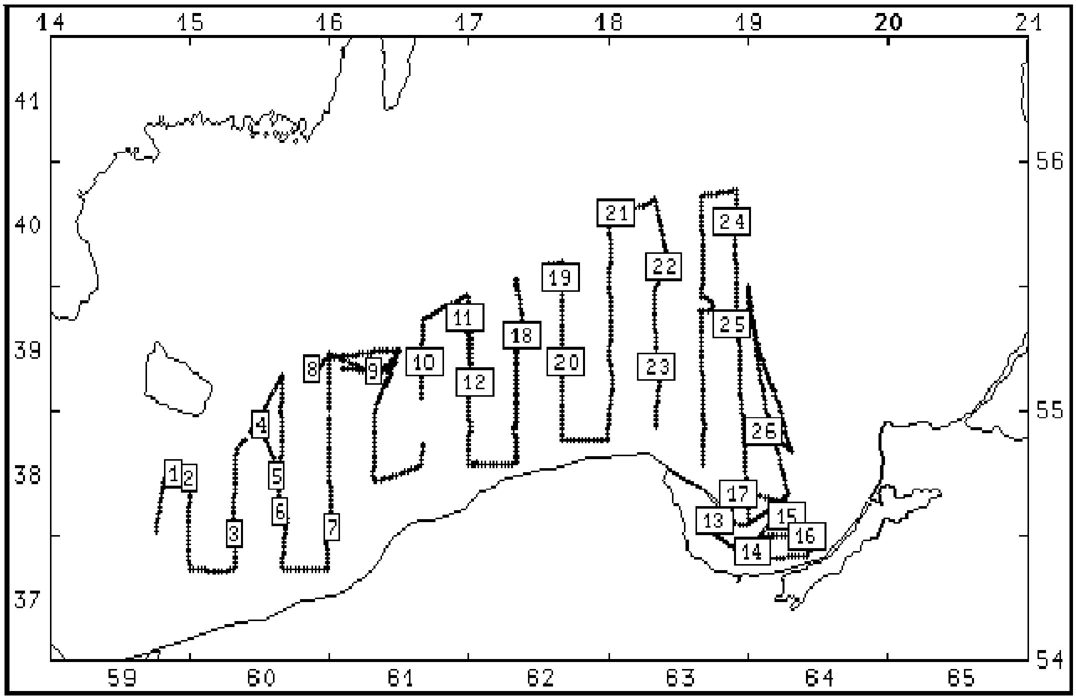


Figure 2.3.1. Cruise track and trawl stations of R/V Baltica (5-21 October 1999).



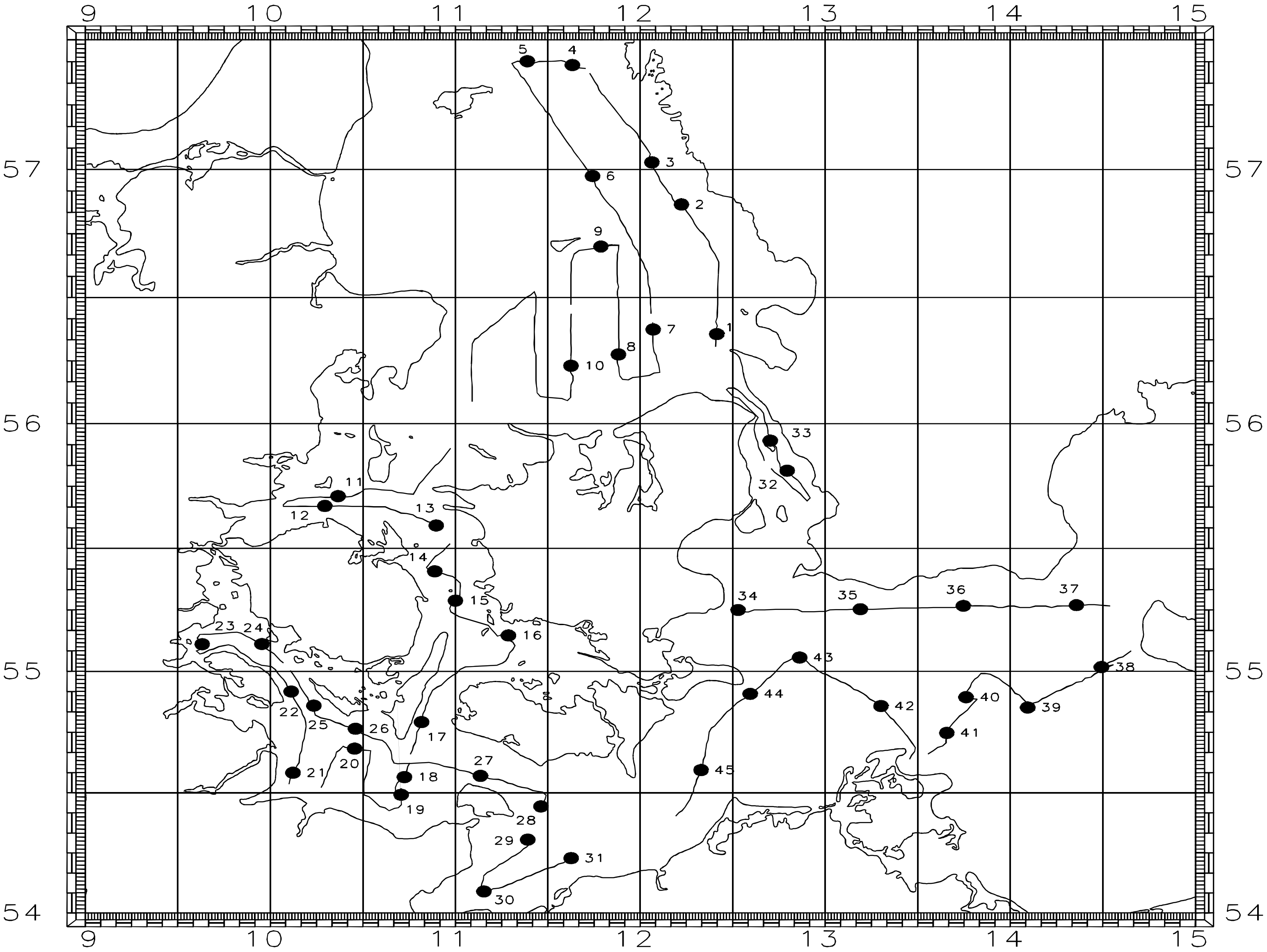


Figure 2.4.1. Cruise track and trawl stations r/v SOLEA October 1999

Figure 2.5.1.1. Cruise track of the R/V Julanta in Subdivision 32 in October 1999

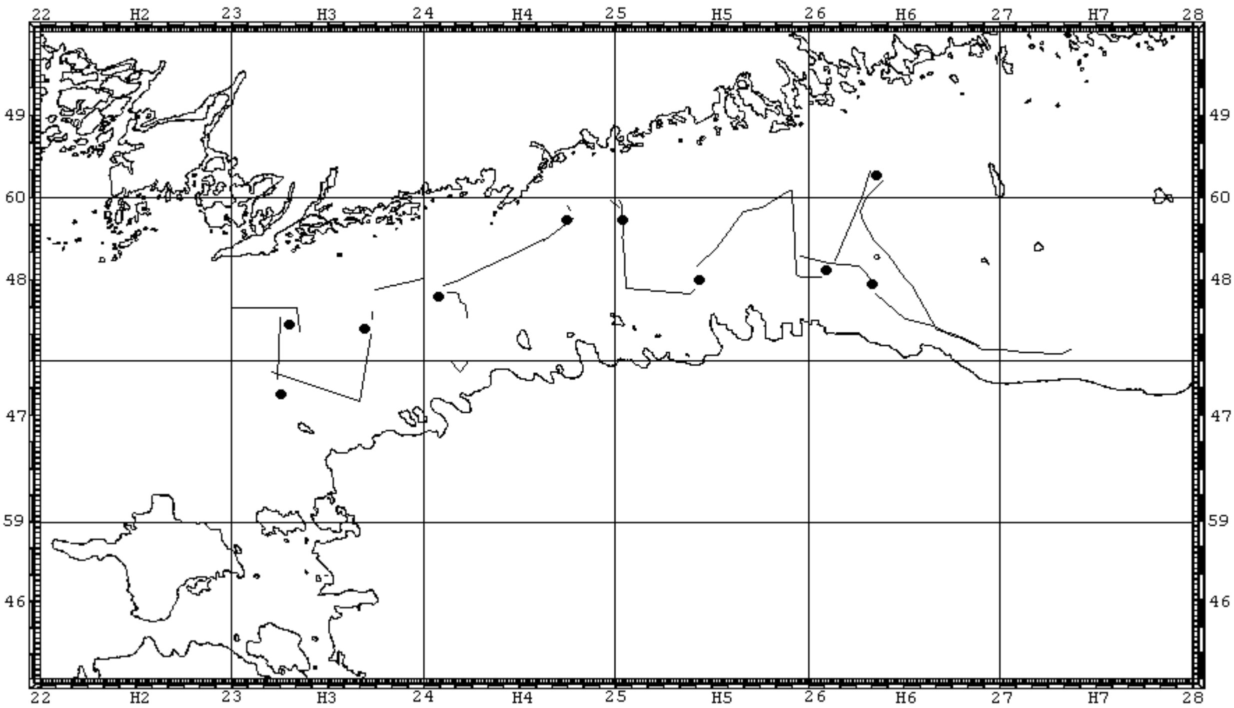


Figure 2.5.2. Hydroacoustic survey track in Subdivisions 29N-31 and position of trawl stations.

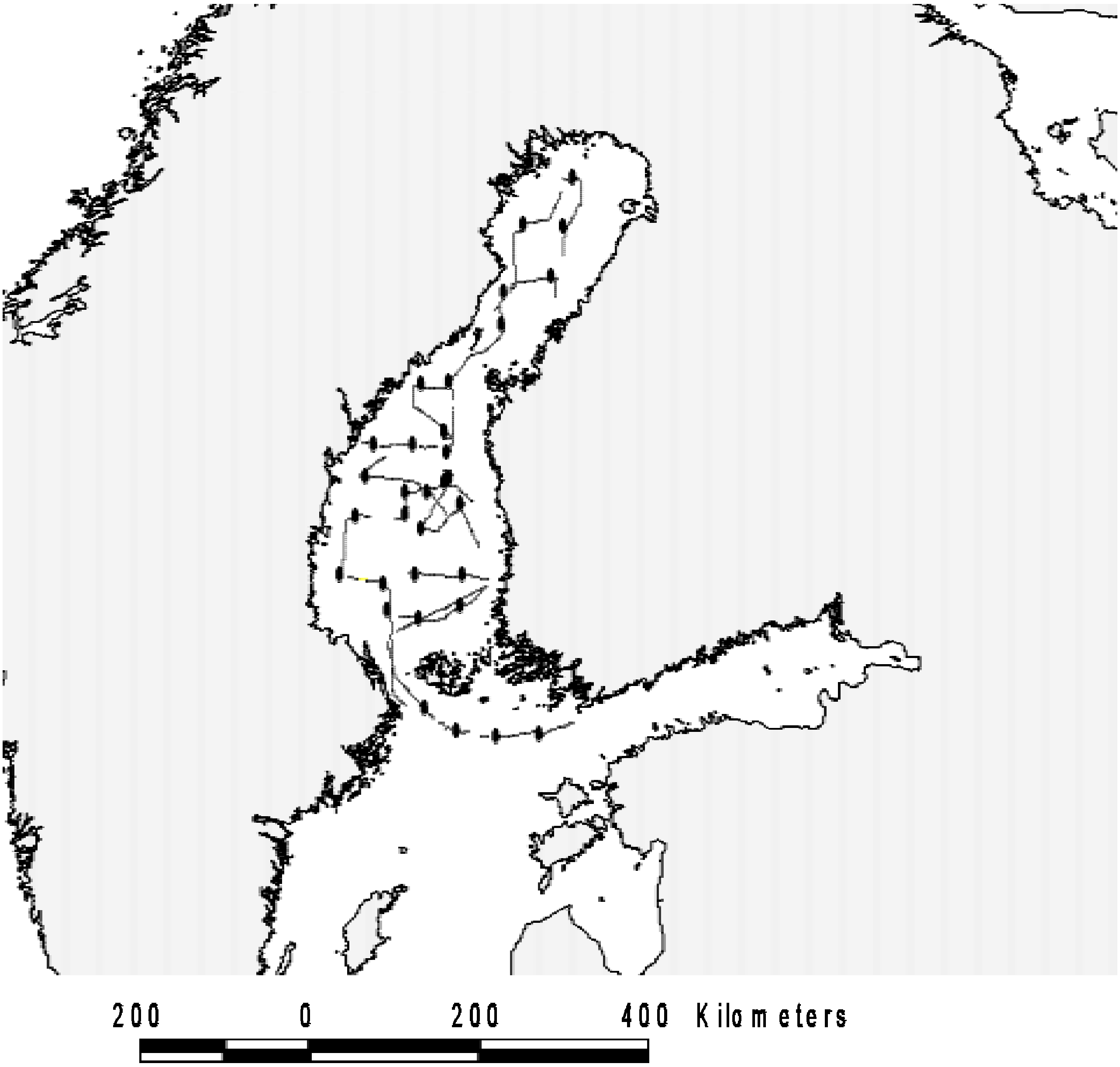


Figure 2.6.1. Distribution of Sa during day and night on the experimental acoustic track.

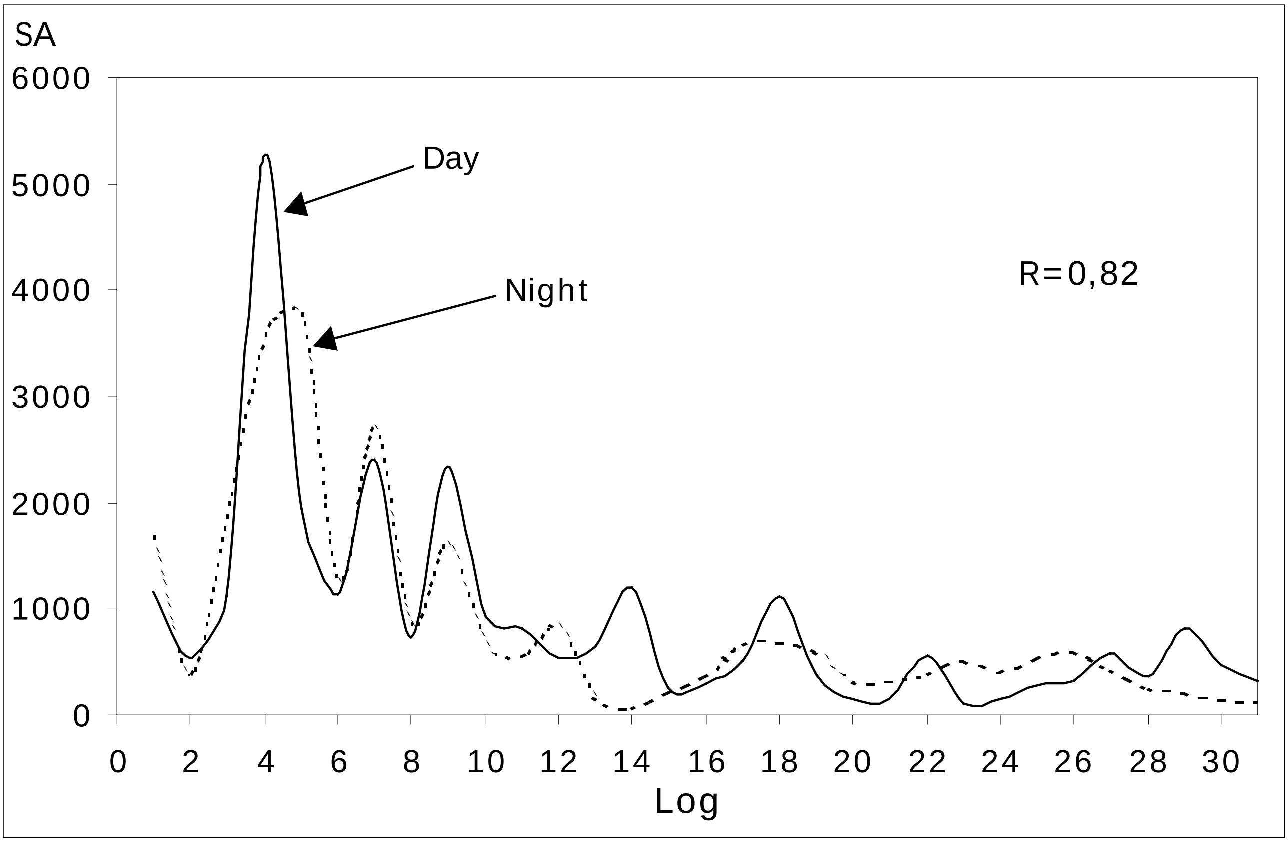


Figure 2.6.2. Cumulative Sa during day and night on the experimental acoustic track.

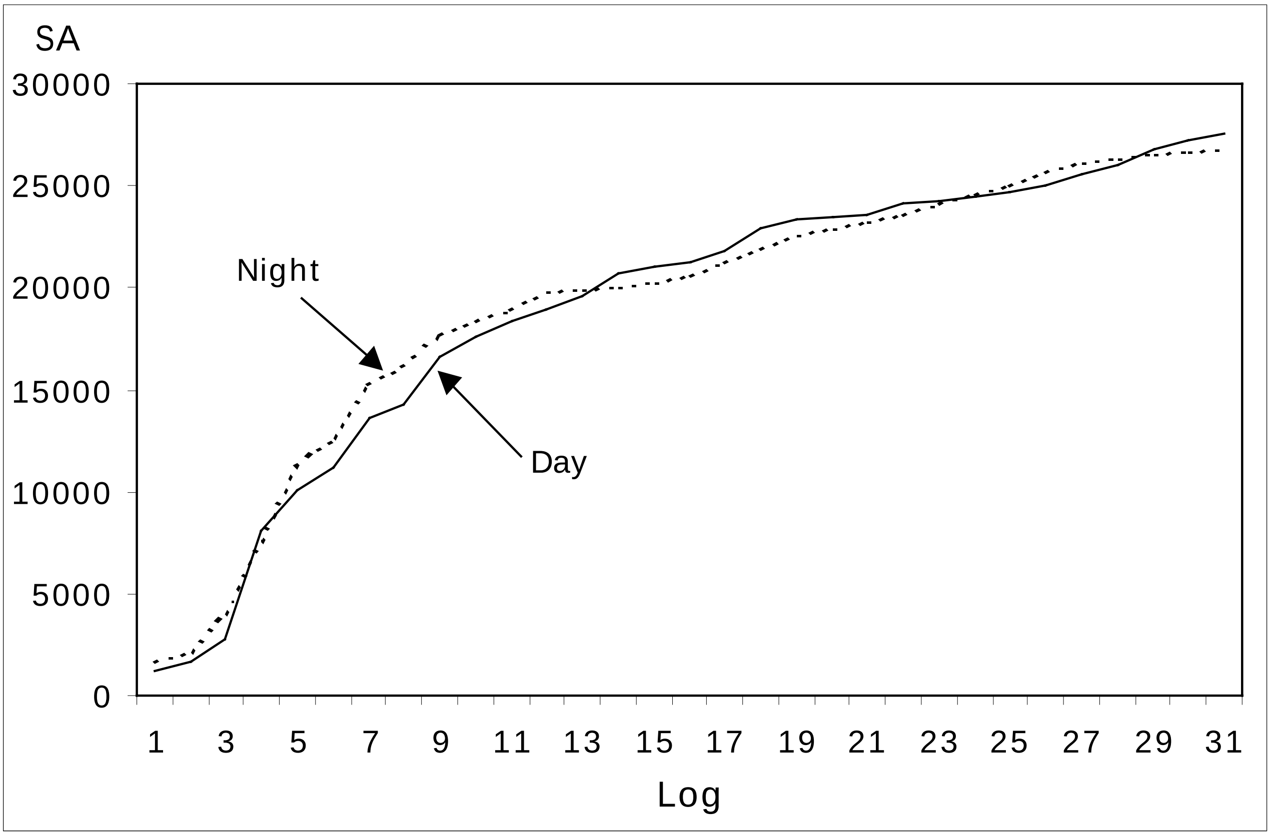


Figure 2.6.3. Catch composition in the sample trawls.

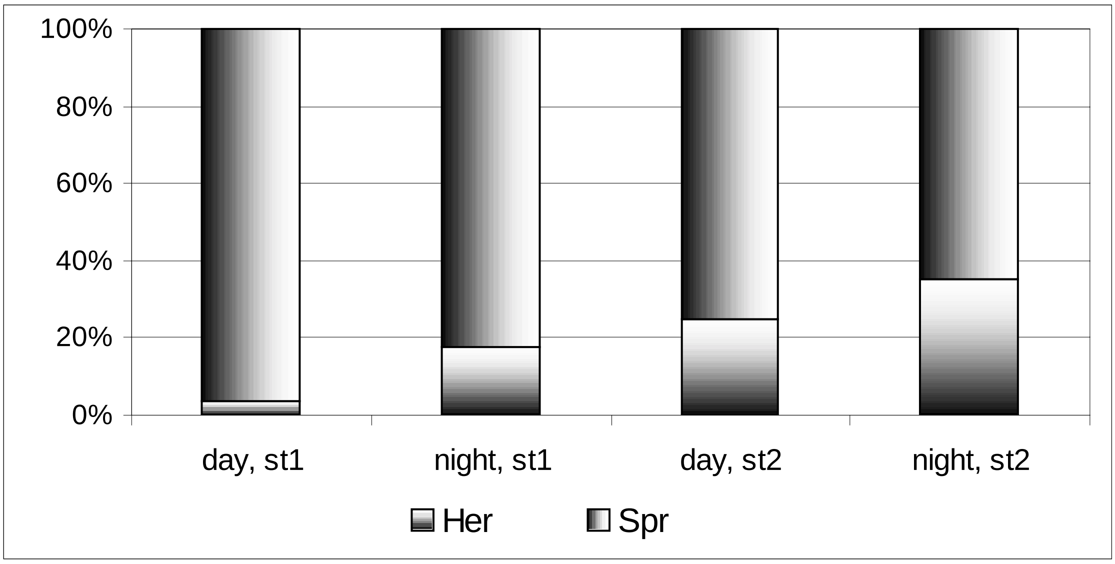
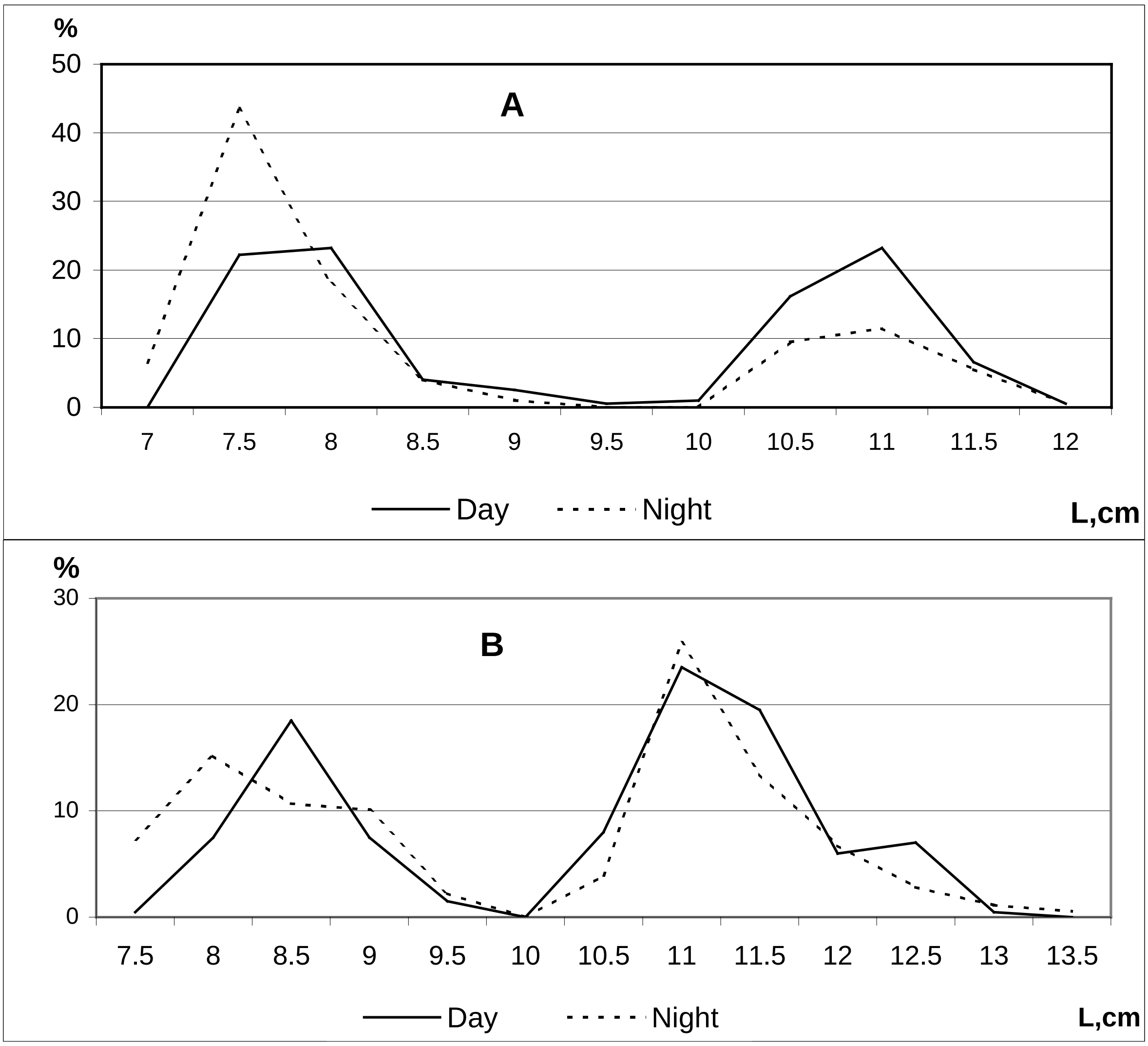


Figure 2.6.4. Length composition of sprat in the sample trawls (**A -**St1**, B** -St2).



3 CORRECTIONS UND UPDATE OF THE HYDROACOUSTIC DATABASE BDA1 FOR THE YEARS 1991 TO 1999

The database BAD1 contains the results of the Baltic acoustic surveys for the last 10 years. This dataset enables a simple and fast access to the abundance and biomass estimates for herring and sprat per age group and ICES statistical rectangle in the Baltic. Some obvious errors have been found in the former data set and therefore it was stressed during the last WGBIFS meeting to check and correct the data by the contributing parties. During the last Working Group meeting it was recommended to deliver the updated data abut two month before the next meeting. Nevertheless in general the data were delivered to late, incomplete or using wrong formats. In consequence much time during this meeting was spent to correct and compile the data.

The following data are still to be updated and should be sent to E. Götze until 1 June 2000:

- Poland: 1994-1998
- Sweden: 1992-1998

Those deadlines used in the past to deliver the data for coordinator have been always violated and thus they are not useful. For the future it is very important that the data needed for evaluation of the state of the stocks is available in good time before the assessment meeting (at the end of February at latest). Otherwise the results cannot be taken into account in assessments. It is also important that the agreed data format is used, when sending the data for coordinator.

The content of the present database BAD1 is summarised in Table 3.1.

Table 3.1 Revised database BAD1

CCODE	SHIP	YEAR
ARG99	Argos	1999
ATL96	Atlantniro	1996
ATL97	Atlantniro	1997
ATL98	Atlantniro	1998
ATLD99	Atlantida	1999
BAL99	Baltica	1999
BAP91	Baltijas Petnieks	1991
BAP93	Baltijas Petnieks	1993
JUL99	Julanta	1999
MON92	Monokristal	1992
MON94	Monokristal	1994
MON95	Monokristal	1995
SOL94	Solea	1994
SOL95	Solea	1995
SOL96	Solea	1996
SOL97	Solea	1997
SOL98	Solea	1998
SOL99	Solea	1999

4 PLANS FOR HYDROACOUSTIC EXPERIMENTS AND SURVEYS IN 2000 AND 2001

In 2000 all the Baltic State countries (exc. Lithuania) are intend to take part in acoustic survey and experiments. The list of participate research vessels and period of investigation is as follow:

Vessel	Country	Area of investigation (ICES Sub-div.)	Period of investigation	Calibration of the transducer
ARGOS	Sweden	27 and parts of 24, 25, 26, 28, 29S	9-27.10. 2000	in Sweden
ATLANTIDA or ATLANTNIRO	Russia, Latvia	26, 28	1-25.10. 2000	in Norway
BALTICA	Poland	24, 25, 26 (the Polish EEZ only)	2-20.10. 2000	in Norway
JULANTA	Estonia, Finland	29N, 30, 31, 32	20.09-30.10. 2000	in Finland
SOLEA	Germany, Denmark	22, 23, 24 and part of 21	29.09-20.10. 2000	in Germany

The preliminary plan for acoustic surveys and experiments in 2001 for majority of institutes will be taken after verification of budget plans.

The main results of BIAS should be summarised and reported to the acoustic surveys co-ordinator (F. Arrhenius, Sweden) not later than two months before ICES BFAS meeting of the next year. These results are intended for the information of the ICES Assessment Working Groups.

In May 2000 one experiment will obviously be conducted to analyse Baltic Sea sprat target strengths. Connected to the acoustic assessment of sprat, a Russian research vessel will try to fish trawl catches containing only sprat and the dependence of TS on length of sprat will be analysed. The study will at best produce a TS-length conversion model for sprat suitable for certain sampling conditions (scattered layers in the evening in spring). A different model may be needed for autumn surveys. Although, at the moment no other suggestions for TS experiments are given, an obvious starting point for TS analyses would be to utilise the existing acoustic and biological material (possibly considering the selectivity of the fishing gear) to find out the performance and discrepancies of the present approach of a fixed target strength equation. The methodology of target strength measurements has recently been summarised in ICES Cooperative Research Report edited by Egil Ona (1999). In the analyses of the historical material, for example the maximum resolution densities (Ona and Barange 1999) should be considered to select isolated targets for the analyses.

5 MANUALS FOR BALTIC INTERNATIONAL DEMERSAL TRAWL SURVEY (BITS) AND ACOUSTIC SURVEY (BIAS)

5.1 Update of the Baltic International Trawl Survey (BITS) Manual

Since the WGBIFS meeting in Tallinn 1999 the BITS database has developed according to the time schedule presented at the meeting and nearly all data have been delivered to ICES.

The unique key to combine the data from HH, HL and CA records was supposed to be year, quarter, ship and haul number. However, during the development of the database and when receiving data, it was realised that this was not always an unique key since haul number is sequential within cruise and some countries have more than one cruise in a quarter. In the time since last meeting, it has therefore been decided to make station number to mandatory and included it as a key in the database. This has been implemented in the manual at this meeting. In addition, unknown depth should in the future be recorded as space instead of zero. Zero cause problems in the database and space is used for all other unknown variables.

The updated BITS-manual is shown in Annex 2.

5.2 Update of the Baltic International Acoustic Survey (BIAS) Manual

5.2.1 Modifications made during the BIFS meeting

The following changes were made during the working group meeting:

1) ICES statistical rectangles were extended to the 10m depth line. The areas of the strata were revised and added to the manual
2) A new table containing information on the different gears used in the acoustic surveys was updated and added to the manual.
3) A new version of Figure 2.1 was added.
4) Some corrections were made in the text of the manual (see BIAS Version 0.72)

5.2.2 Problems to be solved between meetings and to agree in the next meeting

Several issues concerning the BIAS Manual were discussed during the WGBIFS meeting and are summarised below:

Section 2: Survey design

Basic aspects/requirements of survey design

The objective of acoustic surveys is to get an unbiased estimates of herring and sprat abundance in the area sampled. In order to achieve this, a clearly defined sampling strategy is necessary. Each specimen should have the same probability to be sampled. For any future sampling design for acoustic surveys it is a prerequisite to define optimal sample sizes (number and length of transects), measures of abundance (estimation method) and errors (variance, and bias in the data collections). Aspects of randomisation, sequential sampling and quality assurance and control should be also taken into account. First results will distributed to the working group members before the next WGBIFS meeting by Joachim Gröger, Rostock, Germany. The results will be discussed during the next WGBFIS meeting in order to modify the manual.

Observation time

Concerning the survey time, at present the western Baltic area is still covered by two separate surveys in different times of the year. One is carried out in July (Skagerrak, northern Kattegat) and the other in September/October (southern Kattegat, Sub-divisions 22 to 24). The July survey is connected to the North Sea acoustic summer surveys whereas the October survey is linked to the Baltic Sea acoustic surveys. In order to get a more complete picture of the herring and sprat distribution in the western Baltic area, in the future, it is recommended by the working group to cover the whole area at the same time.

Section 4: Fishery

Gear

A significant problem within acoustic surveys is the ability to obtain representative trawl samples to be associated with allocated acoustic information. The problem is related to this specific selectivity of the applied trawl gear which may bias (1) the species composition and (2) the length distribution of target species and (3) the age distribution.

Length distribution, weight distribution, age distribution

Sample sizes for a representative length distribution per trawl haul have to be evaluated. Sample sizes for a representative weight/age distribution per rectangle/sub-division have also to be evaluated. First results will distributed to the working group members before the next WGBIFS meeting by Joachim Gröger, Rostock, Germany. The results will be discussed during the next WGBFIS meeting in order to modify the manual.

Section 5: Data analysis

Species composition and length distribution

Currently an unweighted mean is used for estimating the species composition and the length distribution. In cases where catches are not representative it might be more appropriate to give those catches a minor weight. In order to clarify whether equally or unequally weighted means should be used, it seems necessary to define the representativeness and how to derive plausible calculation methods and weighting criteria from this definition. First results will distributed to the working group members before the next WGBIFS meeting by Joachim Gröger, Rostock, Germany. The results will be discussed during the next WGBFIS meeting in order to modify the manual.

Target strength of an individual fish

See Section 7.2 of the report. Target Strength is the keystone of fisheries acoustics and needs further work for the clupeoids stocks in the Baltic Sea. During the next FAST meeting in April, Harlem (Netherlands) the target strength of Baltic fish species will be one main topic.

Lack of sample hauls

The interpolation method must be evaluated. First approaches to investigate the problem will be presented during the next WGBIFS meeting by Fredrik Arrhenius, Lysekil, Sweden.

Updated BIAS manual is shown in Annex 3.

6 RESULTS FROM THE DEMERSAL TRAWL SURVEY BY THE TRADIONAL AND NEW SURVEY TRAWL

6.1 Gear inter-calibration on national level

In between gear inter-calibration on a national basis is performed according to the recommendations given by the ICES 1st and 2nd Workshop on Standard Trawls for Baltic International Fish Surveys (Anon. 1997a; 1998a) as well as according to the recommendations in Anonymous (1999a; 1999b).

6.2 Purpose of the national inter-calibrations

The aim of the national inter-calibration between the existing gears and the new standardised gears in full scale is to obtain conversion factors in order to recalculate the historical BITS data. Furthermore, to inter-calibrate two different sizes of the new TV3-trawl on board one of the medium sized research vessels. Finally, to test different types of gear rigging for the large TV3 trawl for soft and hard bottom localities, respectively. Task description:

I. In between gear inter-calibration on a national basis:

A) Field tests and national inter-calibration between the currently used trawl gears and the new standardized large, full scale TV3-trawls gears in relation to the current standard surveys.
B) Field tests and inter-calibration of large and small, full scale TV3 trawls, respectively.
C) Field tests and inter-calibration of different types of gear rigging (light and intermediate ground-gear construction) for soft and hard (rocky) bottom, respectively, for large, full scale trawls.
D) Analysis of the field test inter-calibrations to link new and old data time series on national level, presentation of results and preliminary reporting.

Consequently, the existing national survey data time series can be converted to the units of the new trawls and can be used as historical data series in relation to the new standard when using the data for resource assessment purposes. This is carried out in order to obtain a relatively fast “up-grading” of existing national, historical survey data time series from the current BITS in the Baltic Sea. Inter-calibration is necessary in order to assure that the existing national time series can be directly used as historical research data with the new trawl design and that the surveys and time series can be continued based on an international standard. This procedure will shorten the transition period as the existing time series may then be converted to the new standard relatively fast in relation to use of the data for fish resource assessment purposes.

6.3 Field tests and national inter-calibration activities performed between the currently used trawl gears and the new standardised full scale TV3-trawls

Under the ISDBITS project field tests and between gear inter-calibrations on a national level between the currently used trawl gears and the new standardized full scale TV3-trawls gears in relation to the current BITS surveys have been carried out in 1st and 4th quarter of the year in 1999. In general, the field tests of the trawls have followed the recommended requirements and design given in ICES 3rd and 2nd (and 1st) Workshop on Standard Trawls for Baltic International Fish Surveys (Anon., 1999a; 1998a; 1998e; 1997a) as well as followed the recommendations given in Anonymous (1999b). For all types of inter-calibrations repeated parallel (overlapping) hauls at the same locality with the two different gears have been carried out on selected localities in relation to the BITS surveys. The inter-calibrations have been carried out in form of experimental surveys designed specifically to derive conversion factors. This approach is considered optimal, as it is possible to select areas and periods where good concentrations of fish may be available covering all size groups and species. The inter-calibration stations have been selected based on recent catch rates obtained during the BITS surveys.

As noted in the ISDBITS EU-study project, the 1999 BITS activities include both a survey, conducted with the historically used trawls, and between trawl inter-calibrations experiments. When all results from the calibrations are available all existing survey information will be expressed in units corresponding to the large TV3-trawl.

The inter-calibration requires and has in the spring and autumn 1999 included that each country carry out comparative fishing with its historical used gear and the new TV3-trawl. It was in the “Report of the workshop on Baltic trawl experiments”, Rostock January 1999 (ICES CM 1999/H:7), recommended that the comparative trawling with the new and old gear should be made on the same trawl track lines, which are covered by trawling in the same direction. The second haul should be made immediately after the first. In order to balance out any possible effects of 1st and 2nd trawl coverage’s the order of the gears should alternate between stations, i.e. following the sequence shown in the table below.

Station	1	2	3	Etc
Gear used	New-Old	Old-New	New-Old	Etc.

The duration of the two comparative trawl hauls should be set at 0.5 hours each, with identical trawling speed.

Preliminary analyses of the inter-calibration experiments in 1999 were carried out during the IDSBITS meeting in Lysekil December 1999.These analyses showed that additionally experiments are necessary during the surveys in 2000.

In Table 6.1 an overview of the performed inter-calibration activities in 1999 is given including information of country, research vessel, national trawl gear, type of TV3-trawl, area as ICES Sub-Division, time (month), number of inter-calibration days (per survey / month), number of inter-calibration hauls, number of stations as well as comments on the type of inter-calibration performed.

Table 6.2 summarises the national experiments during the spring surveys 2000. During the IDSBITS meeting in June 2000 further analyses should be carried out in order to obtain the national conversion formulas.

An overview of field tests in 1999 and 2000 by month (survey) and further coming technical testings to be performed in year 2000 by month (survey) are given in **Table 6.3**, respectively.

Table 6.1. Overview of the inter-calibration activities in 1999.

Country	Denmark		Germany	Latvia		Poland		Russia	Sweden	
Vessel	Dana	Dana	Solea	Grifs	Hoglande	Baltica	Baltica	Atlantida	Argos	Argos
National gear	Granton	Granton	HG 20/25	LBT	LBT	P 20/25	P 25/26	Hake 4M	GOV / FOTOE	GOV / FOTOE
TV3 gear, version	930	930 / (RH*)	520	520	520	930	930	930	930	930
Area (ICES SD)	25	24 / 25	24	28	28	25 / 26	25 / 26	26	24-28	24-28
Time (Month)	March	November	November	March / April	November	Feb. / March	November	March	March	November
Number of hauls	16	42	22	16	8	24	22	20	26	6
Number of stations	8	21	11	8	4	12	11	10	12	3
Comments	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls

*) RH = including 3 days comparison of 7 paired hauls between normal and rockhopper ground gear.

Table 6.2. Overview of the intercalibration activities in 2000

Country	Denmark		Germany			Estonia	Poland	Russia	Latvia		Sweden	
Vessel	Dana	Dana	Solea	Solea	Solea	Kootsaare	Baltica	Atlantniro	MRTK-Typ	MRTK-Typ	Argos	Argos
National gear	Granton	Granton	HG 20/25	TV3 930	HG 20/25	27. 8	P 20/25	Hake 4M	LBT	LBT	GOV / FOTOE	GOV / FOTOE
TV3 gear, version	930	930	520	520	520	520	930	930	520	520	930	930
Area (ICES SD)	24 / 25 / 26	24 / 25 / 26	24 / 25	22	24	28 / 29	25 / 26	26	28	28	24-28	24-28
Time (Month)	March	November	March	March	November	November	Feb/March	February	March	November	March	November
Number of hauls	38	20	14	20	18	16	24	31	26	20	18	24
Number of stations	19	10	7	10	9	8	12	16	13	10	12	12
Comments	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls	Paired hauls

Table 6.3. Technical testing of the full scale TV3 trawls in 1999 and 2000

	1999							2000		
Country	**Denmark**		**Germany**		**Estonia**	**Sweden**		**Denmark**		**Sweden**
Vessel	Dana	Dana	Solea	Solea	Kootsaare	Argos	Argos	Dana	Dana	Argos
TV3 gear, version	930	930 (RH+STD*)	520	930	520	930	930	24 / 25 / 26	24 / 25 / 26	24 / 25
Area (ICES SD)	25	24 / 25	24	24	29	24 / 25	24 / 25	30 (RH+STD	930 (RH+STD	930
Time (Month)	March	November	November	March	November	March	November	March	November	March
Number of hauls	16	43	9	2	3	13	11	38	20	18
Comments		*)	1)			2)		*)		

1) Large TV3 trawl can not be handled on board which has been shown by initial technical testings in the spring 1999.
2) Video of the trawl opening and the trawl bottom contact were recorded.
*) RH+STD = Including tests of Rockhopper-Bottom-Gear plus Normal-Standard-Bottom-Gear

7 BIOLOGICAL SAMPLING AND TS CONVERSION FORMULAS PRESENTLY APPLIED IN BALTIC DURING HYDROACOUSTIC SURVEYS

7.1 Biological sampling

For the estimation of the stock biomass measured during hydroacoustic surveys it is necessary to take fish samples. The samples should represent the length distribution and species composition of the fish estimated by hydroacoustics. Therefore, the fishing should in principle catch every fish in the volume of water hauled. To approximate this, the selectivity of the used trawl should be low. However, selectivity problems are likely to occur even with specially designed trawls. Even larger selectivity problems are likely with commercial trawls that are frequently used in hydroacoustic surveys.

Some experiments of biological sampling have been conducted on Baltic Sea. For example, in 1997 two research vessels, Argos from Sweden and Solea from Germany, carried out a co-ordinated survey in the Baltic Sea to investigate trawl catch composition of herring and sprat occurring in high densities in scattered layers. The analysis indicated that the selectivity for young fish was different between trawls mainly due to different mesh sizes in the codend. Thus, there was a need to estimate the real size distribution. A correction function was designed by applying selectivity data obtained from commercial trawls. Results of Bedtke *et al.* also indicated that the larger the trawl is, the larger the proportion of larger fishes in the catches.

In 1999 WGBIFS agreed to design future field experiments in order to investigate the fishing performance of different gears with the aim to identify and quantify sampling errors due to selectivity problems. These experiments should include intercalibration for the different trawl types used in the Baltic. One important aspect is that all trawls will use the same mesh sizes in the codend as stated in the BIAS manual. The topic of biological sampling was to be discussed in the proposed workshop in January 2000 but unfortunately the workshop was cancelled. Different aspects of biological sampling in hydroacoustic surveys have been briefly described in Everson and Miller (1999). They conclude that although in some cases causal links have been found, the present knowledge is not sufficient to provide complete deterministic model for predicting the target strength and its variation under given conditions.

7.2 Target strength conversion formulas

In the application of acoustic fish abundance estimation, the target strength of the fish is one of the keystone parameter for the conversion of integrated acoustic energy to relative or absolute fish abundance. One of the most important factors influencing the final results is related to target strength conversion formulas. The target strength conversion is usually expressed as an averaged function of fish length. The actual target strength constants applied since 1983 for the Baltic Sea acoustic surveys are in reality estimates obtained for North Sea herring, sprat and cod.

Applying North Sea TS values as such directly to Baltic Sea may produce systematic error and the present TS values used may not be suitable for all species and for various seasons. Additionally, hydrographical and biological variability in back-scattering strength may obscure the use of fixed constants in a target strength equation.

The WGBIFS recommended already a few years ago that an extensive review on the target strength conversion formulas and their application for acoustic fish stock abundance and biomass estimations should be made. In order to discuss and organise experiments with the objective to find and verify new target strength conversion formulas, in 1999 WGBIFS proposed a workshop on Baltic Sea TS to be organised in January 2000. However, the task was shifted to be handled by the WGFAST in April 2000 where Baltic TS is one of the specified tasks.

8 THE HYDROACOUSTIC DATABASE BDA2: STATE OF THE ART

The database BAD2 contains the acoustic basic data on ESDU and all the biological fisheries data on haul level, respectively. The HERSUR/BALTDAT exchange format specifies the format for the acoustic/biological data for the herring/sprat surveys in the North Sea and the Baltic Sea.

Since the revised HERSUR/BALTDAT exchange format (Version1, Rev. V, March 2000) was just presented during the meeting (Annex 4 and 5), no data could be transferred to the database by the contributing countries in advance.

The following changes/revision were proposed during the meeting by the Working Group:

- The existing HERSUR/BALDAT exchange format should be clearly divided into two separated descriptions:

   1. ASCII with fixed length record format
   2. XML format (suggested format is given in Table 8.1)

- Two additional information columns should be entered in the plain data format description tables of all record types (replacing "comments" column). Measure units should be given for data fields in the "unit" column. The complete definitions and descriptions of data fields including comments should be given in the "description" column (Tables 8.2 – 8.7).
- In the footnote comments and "range" column the information, which should be excluded is stroked through and correction proposals are underlined (Tables 8.2 – 8.7).
- The working group has found the description of the new XML format confusing in the HERSUR/BALTDAT (Version 1, Rev. V, March 2000) manual, especially because the necessary information is divided into several sites. All the necessary information should be given in a same table (as an example see Table 8.1).
- The Appendixes should be prefaced by the list, containing the referensis to the relevant records type.
- Appendix 1A should be apdated by row H – EY500.
- In Appendix 1B in row 4 instead of "mixed" should be "mixed layers".
- Appendix III. The Estonian ship " Koha" does not exist any more. Instead of that it should be "Julanta", also for Finland ship name "Julanta" (for both IYFS Code – JUL)
- For Russia: to add the ship "Atlantida", IYFS Code ATLD.
- Appendix IV. The code for IBTS gears should be apdated for Russian R/P "Atlantida": column 1 – RTA; column 2 – RT/TM (pelagic)
- For R/V "Monokristal" in column 1 – should be RTM; in column 2 – RT/TM
- Appendix V: In NB to add point 3) " for the Baltic Surveys – choise as default - 11. The examples of application could be delited.

Table 8.1. Suggested table layout for the description of XML format in HERSUR/BALTDAT manual.

Field name	Length	Unit of measurement	Range	Type	Description	Mandatory/ Optional
<CruiseInfoRecord RecordType="CI">	2		CI	String	Cruise info record	M
<Country>	3		See appendix III	String	Code of the country the data belongs to	M
<Ship>	4		See appendix III	String	Code of the ship data has been collected from	M
<CruiseNo>	3			Integer	National coding system	M
<Year>	4	YYYY		Integer		M
<DateStart>	8	YYYYMMDD		Integer		M
<DateEnd>	8	YYYYMMDD		Integer		M
<UpperRightCornerLatitude>	9	±DDMM.mmm	50 to 65 degrees	String	Position in degrees, minutes and thousands of minute	O
<UpperRightCornerLongitude>	9	±DDMM.mmm	0 to 28 degrees	String	Position in degrees, minutes and thousands of minute	O
<LowerLeftCornerLatitude>	9	±DDMM.mmm	50 to 65	String	Position in degrees, minutes and thousands of minute	O
<LowerLeftCornerLongitude>	9	±DDMM.mmm	0 to 28	String	Position in degrees, minutes and thousands of minute	O

Tables 8.2-8.7 Suggested format for the description of the tables of the plain format in HERSUR/baltdat manual.

Table 8.2 General cruise information.

a) Cruise info record (CI)

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
					1		Fixed value CI (Cruise Info)
					3	See append. III	Country data belongs to
					6	See append. III	Ship from which data has been collected from
					10		National coding system
					12	YYYY	The Year in which data was collected
					16	MMDD	Date for cruise start
					20	MMDD	Date cruise ended
24 - 31	Upper right corner latitude	8AN	O	~~±DDMMSSS***~~	~~±=N/S, Seconds in thousands of a minute~~	±DDMMmmm***	Latitude of upper right corner of a square covering the entire area for the survey
32 - 39	Upper right corner longitude	8AN	O	~~±DDMMSSS***~~	~~±=E/W, Seconds in thousands of a minute~~	±DDMMmmm***	Longitude of upper right corner of square covering the entire area for the survey
40 - 47	Lower left corner latitude	8AN	O	~~±DDMMSSS***~~	~~±=N/S, Seconds in thousands of a minute~~	±DDMMmmm***	Latitude of lower right corner of a square covering the entire area for the survey
48 - 55	Lower left corner longitude	8AN	O	~~±DDMMSSS***~~	~~±=E/W, Seconds in thousands of a minute~~	±DDMMmmm***	Longitude of lower right corner of a square covering the entire area for the survey
56 - 85	Acoustic contact firstname	30A	O				The firstname of the contactperson on the acoustic data of this survey
					86		The lastname of the contact person on the acoustic data of this survey
					116		The email address of the contact person on the acoustic data of this survey
					176		The first name of the contact person on the fisheries data of this survey
206				-	-		The last name of the contact person on the fisheries data of this survey
236					-		The email address of the contact person on the fisheries data of this survey
							Sounder/integrator used in this survey
296 - 297	Sounder	2AN	M	N=1-9, A=A-I	~~See Appendix IA 'HERSUR/BALTDAT~~	See Appendix IA	

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional.
For all optional fields spaces are valid and indicate not known.

*** DD = Degrees, MM = Minutes, mmm = Thousands of a minute

Table 8.3 Acoustic data.

a) Sa record (SA)

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
1 - 2	Record type	2A	M	SA	~~Fixed value SA (acoustic record).~~		Fixed value SA (acoustic record)
3 - 5	Country	3A	M	~~See Appendix III~~	~~ICES alpha code for Countries.~~	See append. III	Country data belongs to
6 - 9	Ship	4AN	M		~~See Appendix III~~		Ship from which data has been collected from
10 - 11	Cruise No.	2N	M		~~National coding system.~~		National coding system
12 - 15	Year	4N	M	~~YYYY~~		YYYY	The Year in which data was collected
16 - 19	Date	4N	M	~~MMDD~~		MMDD	Date the data of the record was collected
20 - 25	Start time	6N	M	~~HHMMSS~~	~~**Either Start Time or End Time MUST be available.**~~	HHMMSS[****]	Time the collection of data to the record started
26 - 31	End time	6N	O	~~HHMMSS~~	~~**Either Start Time or End Time MUST be available.**~~	HHMMSS[****]	End time for the collection of data to the record
32 - 37	Log Counter	6N	M	~~5+1 decimal value~~	? 0-999999		Number of logcounts*10 (5+1 decimal value)
38 - 41	Transducer Depth	4N	O	~~3+1 decimal~~	? 0-9999	In meters	Position of transducer below seasurface*10 (3+1 decimal)
42	Transducer Number	1N	O		? 0-9 ~~if more then one transducer is used~~		What number of transducer was used (if more then one transducer is used)
43 - 46	Transducer Frequency	4N	M	~~3+1 decimal~~	~~in kHz~~	In kHz	Frequency used by current sounder*10 (3+1 decimal)
47	Distance/time/ping	1A	M	~~D/T/P~~		D/T/P	Field states whether sampling interval is given by distance, time or ping interval
48 - 53	Sampling interval	6N	M	~~5+1 decimal~~	~~No. Miles/Time/Ping (ESDU)~~		No. Miles/Time/Ping (states at which rate data is sampled)
54 - 61	Start latitude	8AN	O	~~±DDMMSSS~~[***]	~~The latitude of the starting position~~ ~~**Either start position or end position of the Integration MUST be available.**~~	±DDMMmmm[***]	The latitude of the starting position (states the position given when sampling was started)
62 - 69	Start longitude	8AN	O	~~±DDMMSSS~~[***]	~~The longitude of the starting position~~ ~~**Either start position or end position of The Integration MUST be available.**~~	±DDMMmmm[***]	The longitude of the starting position (states the position given when sampling was started)
70 - 77	End latitude	8AN	O	~~±DDMMSSS~~[***]	~~The latitude of the ending position~~ ~~**Either start position or end position of The Integration MUST be available.**~~	±DDMMmmm[***]	The latitude of the ending position (states the position given when sampling was ended)
78 - 85	End longitude	8AN	O	~~±DDMMSSS~~[***]	~~The longitude of the ending position~~ ~~**Either start position or end position of The Integration MUST be available.**~~	±DDMMmmm[***]	The longitude of the ending position (states the position given when sampling was ended)
86 - 89	Mean depth	4N	O		~~Mean total ground depth in metres below sea surface~~	In metres	Mean total ground depth below sea surface
90 - 99	Species code	10A	M		~~Species code (As for the IBTS database)~~ ~~**MIXED = 10 M's**~~	See append. VII	Species code (As for the IBTS database) **MIXED = 10 M's**

Table 8.3 Continued.

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
100 - 109	Sa	10N	M	~~XXXXXXXXXX~~	~~5+ 5 decimal (implied decimal point) Calibrated Sa value in m^2 pr. nm numeric, 0 values shall be included when Sa are allocated to herring and sprat. There must be **NO OVERLAPPING LAYERS.**~~	In m^2 per nm	Integrated Sa value per layer (5+ 5 decimal implied decimal point). 0 values shall be included when Sa are allocated to herring and sprat. There must be **NO OVERLAPPING LAYERS.**
110 - 113	Species depth	4N	O		~~The mean depth of the concentrations of herring, sprat or mixed layers, as more layers can be present in the same area.~~	In meters	The mean depth of the concentrations of herring, sprat or mixed layers below sea surface, as more layers can be present in the same area
114 –117	Layer Top	4N	M	~~3 + 1decimal~~	~~Positive: Below the sea surface~~ ~~Negative: Above sea bottom (only bottom layer)~~	In meters	Top of the layer integrated*10 (3+1 decimal) Positive: Below the sea surface Negative: Above sea bottom (only bottom layer)
118-121	Layer Thickness	4N	O	~~3 + 1decimal~~		In meters	Thickness of the layer in which is integrated*10 (3+1 decimal)
122-123	Classification	2N	O	1-4	~~See appendix I B~~	See append. I B	Fish classification (default 4)
124-127	Haul ref.	4AN	O		~~Either haulreferance (3 digits numeric) or ICES square reference~~		Either haul referance (0+3 digits numeric) or ICES square reference (4 alphanumeric)

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional. For all optional fields spaces are valid and indicate not known.

*** Position: DD = Degrees, MM = Minutes, mmm = Thousands of a minute. **Either start position or end position of the Integration MUST be available.**

**** **Either Start Time or End Time MUST be available.**

Table 8.4 Biological data (Fisheries).

a) Record type 1 (HH)

SPECIFICATIONS FOR RECORD TYPE 1 (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
1- 2	Record type	2A	M~~Fixed value~~ HH				Fixed value HH
3	Quarter	1N	M	1 to 4			The Quarter in which the haul was made
4-6	Country	3A	M	~~See Appendix III~~	~~ICES alpha code for Countries.~~	See append. III	Country data belongs to
7-10	Ship	4AN	M	~~See Appendix III~~		See append. III	Ship from which the haul was made
11-20	Gear	10A	M	~~See Appendix IV~~	~~Preliminary code. 1)~~	See append. IV	Gear which was used
21-26	Station no	6AN	O		~~National coding system.~~		National coding system
27-29	Haul no	3N	M	1 to 999	~~Sequential numbering by cruise.~~		Haul number (sequential numbering by cruise)
30-31	Year	2N	M		~~Year is also available from Cruise Info Record~~	YY	The Year in which the haul was made
32-33	Month	2N	M	1 to 12		MM	The Month in which the haul was made
34-35	Day	2N	M	1 to 28/29/30/31		DD	The Day in which the haul was made
36-39	Time shot	4N	M	0000 to 2359, 9999	~~1 to 2400, 9999, In UTC.~~	In UTC	Haul starting time
40-42	Haul duration	3N	M	5 to 90	~~In minutes.~~	In minutes	Duration of the haul
43	Day/Night	1A	M	D, N, space	~~Not known = space filled.~~		Hauling time (day/night), not known = space
44-45	Lat. Degrees	2N	M	50 to 65	~~Shooting position: Degrees Latitude.~~	In degrees	Shooting position: Latitude degrees
46-47	Lat. Minutes	2N	M	0 to 59	~~Shooting position: Min. Latitude.~~	In minutes	Shooting position: Latitude minutes
48-49	Lon. Degrees	2N	M	0 to 28	~~Shooting position: Degrees Longitude.~~	In degrees	Shooting position: Longitude degrees
50-51	Lon. Minutes	2N	M	0 to 59	~~Shooting position: Min. Longitude.~~	In minutes	Shooting position: Longitude minutes
52	East/West	1A	M	E, W			East/west of Greenwich
53-55	Depth	3N	M		~~Depth from sea surface in meters: not known=0.~~	In meters	Bottom depth from sea surface (not known=0)
56	Haul validity	1A	M	I, P, V***	~~Invalid = I. Partly valid = P Valid = V. 2)~~		Validity of the haul : Invalid = I / Partly valid = P / Valid = V
57-64	Hydrographic Station number	8AN	O		~~Station number as reported to the ICES hydrographer.~~		Station number as reported to the ICES hydrographer
65-	66 Recording Code	Species		2N	M ~~See Appendix V~~	See append. V	Recorded species code (default 11)
67-69	Net opening	3N	NU	~~25 to 100~~ Space	~~In meters*10.~~	Space filled	Not used in this record type
70-73	Distance	4N	O	0 to 9999	~~Distance towed over ground in meters.~~	In meters	Hauling distance towed over ground
74-76	Warp length	3N	O	0 to 999	~~In meters.~~	In meters	Length of the trawl warp
77-78	Warp diameter	2N	O	10 to 60	~~In millimetres.~~	In millimetres	Diameter of the trawl warp
79-81	Door surface	3N	O	0 to 100	~~In square meters*10.~~	In square meters	Surface of the trawl door *10
82-85	Door weight	4N	O	100 to 2000	~~In kilograms.~~	In kilograms	Weight of the trawl door
86-89	Buoyancy	4N	O	50 to 200	~~In kilograms.~~	In kilograms	Buoyancy of the trawl door
90-91	Kite dimensions	2N	O	5 to 20	~~In square meters*10.~~	In square meters	Kite dimensions of the trawl *10

Table 8.4 Continued.

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
92-95	Weight ground Rope	4N	O	0 to 300	~~In kilograms.~~	In kilograms	Weight of the trawl ground rope
96-98	Door spread	3N	O	50 to 180	~~In meters.~~	In meters	Spread of the trawl doors
99-100	Padding field	2A	M	Spaces	~~Filled up with spaces.~~		Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M= mandatory, O= optional. For all optional fields spaces are valid and indicate not known.
NU= Not used ~~(See elsewhere for similar field)~~

*** For invalid hauls no species information need to be given.

~~COMMENTS:~~
~~NB: FOR INVALID HAULS NO SPECIES INFORMATION NEED TO BE GIVEN~~

Table 8.5 Record Type 1A (HE)

SPECIFICATIONS FOR RECORD TYPE 1A (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS	UNIT	DESCRIPTION
1-2	Record type	2A	M	Fixed value HE			Fixed value HE
3	Quarter	1N	M	1 to 4			The Quarter in which the haul was made
4-6	Country	3A	M	~~See Appendix III~~	~~ICES alpha code for Countries.~~	See append. III	Country data belongs to
7-10	Ship	4AN	M	~~See Appendix III~~		See append. III	Ship from which the haul was made
11-20	Gear	10A	M	~~See Appendix IV~~	~~Preliminary code. 1)~~	See append. IV	Gear which was used
21-26	Station no	6AN	O		~~National coding system.~~		National coding system
27-29	Haul no	3N	M	1 to 999	~~Sequential numbering by cruise.~~		Haul number (sequential numbering by cruise)
30-31	Year	2N	M	~~65 to 99~~		YY	The Year in which the haul was made
32-33	Lat. Degrees	2N	M	50 to 65	~~Hauling position: Degr. Latitude.~~	In degrees	Hauling position: Latitude degrees
34-35	Lat. Minutes	2N	M	0 to 59	~~Hauling position: Min. Latitude.~~	In minutes	Hauling position: Latitude minutes
36-37	Lon. Degrees	2N	M	0 to 28	~~Hauling position: Degr. Longitude.~~	In degrees	Hauling position: Longitude degrees
38-39	Lon. Minutes	2N	M	0 to 59	~~Hauling position: Min. Longitude.~~	In minutes	Hauling position: Longitude minutes
40	East/West	1A	M	E, W	~~Hauling position:~~		East/west of Greenwich
41-43	Towing direction	3N	O	1 to 360		In degrees	Haul towing direction
44-45	Ground speed	2N	O	20 to 60	~~Ground speed of trawl. Knots*10~~	In knots	Trawl speed over ground*10
46-47	Speed through Water	2N	O	10 to 99	~~Trawl speed through. Knots*10~~	In knots	Trawl speed through water*10
48-49	Wing spread	2N	O	12 to 30	~~In meters.~~	In meters	Trawl wing spread
50-52	Surface current Direction	3N	O	0 to 360	~~0 slack water~~	In degrees	Surface current direction (0 slack water)
53-55	Surface current Speed	3N	O	0 to 100	~~Meters per sec*10~~	Meters per sec	Surface current speed*10
56-58	Bottom current Direction	3N	O	0 to 360	~~0 slack water~~	In degrees	Bottom current direction (0 slack water)
59-61	Bottom current Speed	3N	O	0 to 100	~~Meters per sec*10~~	Meters per sec	Bottom current speed*10
62-64	Wind direction	3N	O	~~0 to 360~~ 1 to 360		In degrees	Wind direction
65-67	Wind speed	3N	O	0 to 100	~~Meters per sec~~	Meters per sec	Wind speed
68-70	Swell direction	3N	O	~~0 to 360~~ 1 to 360		In degrees	Swell direction
71-73	Swell height	3N	O	0 to 999	Metres*10	In meters	Swell height*10
***74 - 77	Net opening	4N	O	0000 to 9999	~~In meters *10~~	In meters	Trawl net opening*10
***78 – 80	Lat. Decimals	3N	M	000 to 999	~~Shooting position (thousands of a minute). Note: if rounded = 000, else truncated value.~~	Thousands of a minute	Shooting position (belongs to HH values) **If rounded = 000, else truncated value.**

Table 8.5 Continued.

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS	UNIT	DESCRIPTION
***81 - 83	Lon. Decimals	3N	M	000 to 999	~~Shooting position (thousands of a minute). Note: if rounded = 000, else truncated value.~~	Thousands of a minute	Shooting position (belongs to HH values) **If rounded = 000, else truncated value.**
***84 - 85	Fishing Strategy	2AN	O	A=D/N/B, N=1-5	~~See Appendix I (example: D5 = Day composite haul)~~	See append. IC	(example: D5 = Day composite haul)
***86-88	Headrope Depth	3N	M	1-999	~~In meters~~	In meters	Trawl headrope depth from sea surface
89-100	Padding field	12A	M	Spaces	~~Filled up with spaces.~~		Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.
** M=mandatory, O=optional.
*** Field added for the HERSUR/BALTDAT projects
For all optional fields spaces are valid and indicate not known.

Table 8.6 Record Type 2 (HL).

SPECIFICATIONS FOR RECORD TYPE 2 (Length frequency distribution)

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
1-2	Record type	2A	M	~~Fixed value~~ HL			Fixed value HL
3	Quarter	1N	M	1 to 4	~~Identical to Record Type 1.~~		The Quarter in which data were collected
4-6	Country	3A	M	~~See Appendix III~~	~~idem~~	See append. III	Country data belongs to
7-10	Ship	4AN	M	~~See Appendix III~~	~~idem~~	See append. III	Ship from which data were collected
11-20	Gear	10A	M	~~See Appendix IV~~	~~idem~~	See append. IV	Gear which was used
21-26	Station no	6AN	O	~~idem~~			National coding system
27-29	Haul no	3N	M	1 to 999	~~idem~~		Haul number (sequential numbering by cruise)
30-31	Year	2N	M	~~65 to 99~~	~~idem~~	YY	The Year in which data were collected
32-41	Species code	10A	M	~~See Appendix VII~~	~~Official NODC-code.~~	See append. VII	Official NODC-code of species
42-43	Validity code	2N	M	~~See Appendix VIII~~		See append. VIII	Species validity code
44-50	No/hour	7N	O	0 to 9999999	~~No. of specimens caught per hour.~~		Estimated number of specimens of current species caught per hour
51-55	Catch Weight /Hour	5N	O	0 to 99999	~~In 100g. Not known= spaces. 1)~~	In 100g	Estimated total weight of the catch of current species per hour
56-58	No measured	3N	M	0 to 999	~~Not known=spaces. 2)~~		Actual number of fish measured from catch**** (not known=spaces)
59	Length code	1AN	M	., 0, 1, ~~5, 9~~ 2, 5	~~Class:~~ ~~1mm =.~~ ~~0.5 cm =0~~ ~~1 cm =1~~ ~~2 cm =2~~ ~~5 cm =5~~		Class: 1mm =. 0.5 cm=0 1 cm =1 2 cm=2 5 cm=5
60-62	Length clas	3N	M	1 to 999	~~Indentifier: lower bound of size class, eg. 65-70cm=65.~~ ~~For classes less than 1 cm there will be~~ ~~an implied decimal point after the 2nd digit, eg. 30.5-31.0cm=305.~~		Indentifier: lower bound of size class*****, eg. 65-70cm=65. For classes less than 1 cm There will be an implied decimal point after the 2nd digit, eg. 30.5-31.0cm=305
63-68	No at length	6N	M	1 to 999999	~~Length classes with zero catch should be excluded from the record (N/hour equals the sum of No at Length).~~		Estimated number of fishes at length caught per hour. (N/hour equals the sum of No at Length). Length classes with zero catch should be excluded from the record

Table 8.6 Continued.

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
69	Sex	1A	O	M,F	~~M=male, F=female~~		M=male, F=female
***70- 76	No.	7N	M	0 to 9999999	~~No. Of specimens caught.~~		Either the actual number or an estimation of actual number of fishes caught of current species
***77- 82	Catch Weight	6N	M	0 to 99999	~~In 100g.~~	In 100 grammes	Either the actual weight or an estimated total weight of the catch of current species
83-100	Padding field	31A	M	Spaces	~~Filled up with spaces~~		Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional.
For all optional fields spaces are valid and indicate not known.

*** Field added for the HERSUR/BALTDAT projects

~~COMMENTS:~~

~~Total catch weights should be given per hour fishing.~~

<u>****</u> If the number measured is zero then the remainder of the record should be filled with spaces.

<u>*****</u> Size classes smaller than those defined in the IYFS manual for reporting length distributions of the various species are allowed.

Table 8.7 Record Type 4 (CA).

SPECIFICATION FOR RECORD TYPE 4 (SMALK's)

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
1- 2	Record type	2A	M	~~Fixed value~~ CA			Fixed value CA.
3	Quarter	1N	M	1 to 4	~~Identical to Record Type 1.~~		The Quarter in which data were collected
4-6	Country	3A	M	~~See Appendix III, ALL~~	~~idem~~	See append. III	Country data belongs to
7-10	Ship	4AN	O	~~See Appendix III~~	~~idem 1)~~	See append. III	Ship from which data were collected
11-20	Gear	10A	O	~~See Appendix IV~~	~~idem 1)~~	See append. IV	Gear which was used
21-26	Station no	6AN	O		~~idem 1)~~		National coding system
27-29	Haul no	3N	M	1 to 999	~~idem 1)~~		Haul number (sequential numbering by cruise)
30-31	Year	2N	M	~~65 to 99~~	~~idem~~	YY	The Year in which data were collected
32-41	Species code	10A	M	~~See Appendix VII~~	~~Official NODC code.~~	See append. VII	Official NODC-code of species
42-43	Area/subarea	2N	M	0 to 3 / 20 to 32			Area (North Sea)/subarea (Baltic sea) type:
	type				~~ICES Statistical rectangles =0~~		ICES Statistical rectangles =0
	(North Sea/Baltic)				~~Four Statistical rectangles =1~~		Four Statistical rectangles =1
					~~Standard NS Roundfish areas =2~~		Standard NS Roundfish areas =2
					~~Herring Sampling areas =3~~		Herring Sampling areas =3
				~~20 to 32~~	~~ICES Baltic Subdivision Area~~		ICES Baltic Subdivision area =20 to 32
44-47	Area code	4AN	M				ICES Baltic rectangle code
48-51	Padding field	4A	M	Spaces	~~Filled up with spaces.~~		Filled up with spaces
52	Length code	1AN	M	., 0, 1, 2, 5	~~Class:~~		Class:
					~~0.1cm =.~~		1mm =.
					~~0.5 cm =0~~		0.5 cm =0
					~~1 cm =1~~		1 cm =1
					~~2 cm =2~~		2 cm =2
					~~5 cm =5~~		5 cm =5
					~~(+Group not allowed).~~		(+Group not allowed)
53-55	Length class	3N	M	1 to 999 idem			Indentifier: lower bound of size class*****, eg. 65-70cm=65. For classes less than 1 cm there will be an implied decimal point after the 2nd digit, eg. 30.5-31.0cm=305
56	Sex	1A	O	M, F	~~Male = M, Female = F,~~		Male = M, Female = F
57	Maturity	1AN	O	1 to 5	~~See Appendix II~~	See Append. II	Maturity ogive***
58	+gr. Ident.	1A	M	+, space	~~Plus group = + else space.~~		Plus group = + else space****

Table 8.7 Continued.

POSITION	NAME	TYPE*	M/O**	RANGE	~~COMMENTS~~	UNIT	DESCRIPTION
59-60	Age/rings	2N	O	0 to 99			*****
61-63	Number	3N	M	1 to 999			******
64-100	Padding field	37A	M	Spaces	~~Filled up with spaces.~~		Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled, except Area code which is to be right justified, space filled.
** M = mandatory, O = optional.
For all optional fields spaces are valid and indicate not known.
*** Sex maturity data are explicitly demanded for roundfish.
**** A plus group refers to the age indicated AND older, respectively to a reading of more than or equal to the specified number of rings.
***** North Sea: For herring and sprat the number of rings must be recorded. For all other species the age.
Baltic Sea: For all species the number of winter rings must be recorded.
****** An additional field has been reserved for no of fish, which allows the information to be presented in a more aggregated form, rather than that identical information has to be recorded for all individual fish of the same size, sex, maturity and age group.

COMMENTS:

Otolith samples may refer to an individual haul or to groups of hauls in the same rectangle or within one sampling area, depending on the procedures on board. If detailed information is available, it would seem appropriate to refer back to the haul no and/or rectangle; these data are optional rather than mandatory.
~~See Record Type 2.~~
~~Sex maturity data are explicitly demanded for roundfish.~~
~~A plus group refers to the age indicated AND older, respectively to a reading of more than or equal to the specified number of rings.~~
~~For herring and sprat the number of rings must be recorded. For all other species the age.~~
~~An additional field has been reserved for no of fish, which allows the information to be presented in a more aggregated form, rather than that identical information has to be recorded for all individual fish of the same size, sex, maturity and age group.~~

9 INDUSTRIAL FISHERIES AND DISTRIBUTION OF JUVENILES OF HERRING, SPRAT AND COD

9.1 Distribution Of Small Mesh Fishery In The Baltic In 1993–1998

The industrial fishery for pelagic species is usually defined as “small mesh” fishery in the Baltic. The industrial fishery of mostly sprat became widespread in Sweden and Denmark in the early 1990s. For instance, almost 95% of Swedish pelagic catches of clupeoids in Sub-divisions 25-28 were landed for reduction purposes in1993 (ICES, 1994). Industrial fishery of pelagic species in Finland has been less extensive and concentrated mainly in the Sub-divisions 29 and 30. The industrial fishery is absent or insignificant in Eastern-Baltic countries.

The by-catch of juvenile herring and sprat is one of the major problems connected to the industrial fishery. According to the official catch statistics, the bulk of the sprat catches (60-75%) were taken in Sub-divisions 25 and 26 in 1993-1998, indicating the key areas for industrial fishery (Figure 9.1.1). The most of herring landings were taken also in the Sub-division 25 and 30 (Fig.9.1.2). The most of the cod catches was taken in the Sub-divisions 25 and 26 as well Figure 9.1.3). The seasonal distribution of catches shows that the most of the sprat, cod and herring are taken in the I and II quarters (Tables 9.1.1-9.1.3).

On the ground of the catch data the Sub-divisions 25 and 26, but also 30 can be expected as the areas where the bulk of the by-catch of young sprat and herring could be taken in I and II quarters of the year.

The results of preliminary estimation of the share of juvenile sprat taken in small mesh fishery in Sub-divisions 25 and 26 and in of juvenile herring in Sub-divisions 25 and 30 are presented in the Tables 9.1.4 - 9.1.6. The calculations were performed using the reported catch in numbers and the latest maturity ogive data (ICES, 1994-1999). The results show that in the last years the catches in small mesh fishery contained 20-27% of juvenile sprat in the Sub-divisions 25 and 26. The catches of I and II quarter contained app. 20% of juvenile sprat (Table 9.1.4 and 9.1.5).

The catches of juvenile herring varied from 7 % in 1993 to 26% in 1998 in the Sub-division 25. In the Sub-division 30 the mean share of juvenile herring was 28% (Table 9.1.6). The results indicate the significant occurrence of juvenile pelagic fish in the key areas and periods of small mesh fishery in the Baltic.

9.2 Review AND UPDATE of the information available on immature herring, IMMATURE SPRAT and undersized cod taken in the small mesh fisheries

9.2.1 Immature herring and immature sprat in small mesh fisheries

The percentage of immature Baltic sprat in ICES Sub-divisions 22-32, and immature herring in the ICES Sub-divisions 25-29, 32 have been determined using the total catch in numbers since 1974 and maturity ogives previously applied in the assessment for these two species. The results presented are in percent of numbers.

Table 9.2.1.1 indicates significant fluctuations between years in the amounts of immature sprat varying between 10 and 66% of total catch. The fluctuations are determined mostly by the strength of the sprat year classes that may fluctuate considerably in different years. The share of immature sprat varies significantly by the ICES Sub-divisions as well, and reaches the greatest values in the ICES Sub-division 22 (Table 9.2.1.2). The share of immature herring in total stock was more stable compared to sprat (Table 9.2.1.3). This results from relative low fluctuations of herring recruiting year class strength. As shown in the Table 9.2.1.4, the smallest amount of immature herring in years 1997-1998 was recorded in the ICES Sub-division 27 (about 5% in average from 1997-1998) and the greatest one in the ICES Sub-division 32 (35,4% in average from 1997-1998).

9.2.2 Information on juvenile herring and sprat in Polish small mesh fisheries investigations

Excessive catches of young fish may reduce the recruitment to spawning stock if such catches often arise. Juvenile herring and sprat always occur in the catches of small mesh fisheries; these fisheries are mostly for sprat. In the Polish investigations conducted in the ICES Sub-division 26 classified as juvenile herring fish below 16 cm and as juvenile sprat fish below 10 cm.

Samples were taken on board of fishing cutters, large trawlers catching for industrial purposes and on the r.v. "Baltica". Each sample was sorted and weighted.

Juvenile fish is especially abundant in industrial catches. In the ICES Sub-division 26 up to 78% in weight of single catch has been observed to be juvenile herring (Table 9.2.2.1). Taking into account the present sprat fishery, the amount of juvenile herring taken in this fishery may significantly reduce the recruitment to the SSB and especially to the coastal spring spawning herring population that is presently at a low level. Juveniles are unevenly distributed, the amount of juveniles was approximately 2-3 times higher in catches on coastal fishing grounds compared to the open sea catches (Table 9.2.2.2). Occurrence of juvenile herring increases especially in the IV and I quarter of the year when young and older fish form mixed shoals and the sprat fishery intensifies (Tables 9.2.2.3 and 9.2.2.4; Grygiel 1999).

9.2.3 Information on undersized cod taken in Polish small mesh fisheries

Undersized cod were sampled at sea on Polish cutters catching sprat and herring in 1998. The minimum landing size for cod is 35 cm. The by-catch of cod was measured, sorted and weighted. In total 46 hauls were investigated. The presented data on undersized cod were divided according to the gear performance. The results are presented in Table 9.2.3.1. Information on gear performance was obtained by a net echosounder. The amount of undersized cod in combined bottom and pelagic herring and sprat hauls was very low and amounted 0.16% in weight. The catch in pelagic hauls of herring and sprat consisted of only 0.03% undersized cod in weight. The amount of undersized cod in bottom hauls varied with the trawling depth. The catch in bottom hauls made deeper than 50 m contained only on average 0.08% of undersized cod in weight. However the bottom hauls made below 50 m contained 2.06% of undersized cod in weight. A more comprehensive data set on undersized cod in small mesh fisheries is expected as a result of the ongoing EU project (International Baltic Sea Sampling Programme for Commercial Fishing Fleets).

9.2.4 Geographical distribution of juvenile cod

Geographical density distribution of juvenile cod in various surveys in 1994-1997 are given in Figures 9.2.4.1-9.2.4.7. The data has been submitted by DIFRES/Hirtshals/J. Rasmus Nielsen. Figures 9.2.4.1-9.2.4.4 contain results from R/V DANA surveys, Figures 9.2.4.5-9.2.4.6 information from R/V SOLEA and Figure 9.2.4.7 data from R/V BALTICA is given. The distribution of juvenile cod in 1994 show higher aggregation in south of Bornholm and few cod in Hanö Bay and central Baltic (Figure 9.2.4.1). In December 1995 juvenile cod were more dispersed (Figure 9.2.4.2) as in 1996 as well. The results from R/V BALTICA (Figure 9.2.4.7) indicate the importance of Polish coast as a nursery area for Baltic cod as shown by drift modelling as well.

Table 9.1.1. Annual and quarterly catches of sprat by Sub-divisions in 1993-1998, t.

Sprat	**Annual catches**										
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1993	2991	0	4734	36499	59140	26500	40761	3421	4016	11	0	**178073**
1994	8300	0	11700	83300	117200	10300	47500	8400	4100	0	0	**290800**
1995	9900	0	8700	106600	73000	30300	56600	10100	8200	800	0	**304200**
1996	7900	0	1700	153500	136900	33700	68800	14600	20900	1500	0	**439500**
1997	8500	0	5000	203700	125200	45200	80300	36800	22400	2300	0	**529400**
1998	2484	0	6131	173053	91339	89779	53219	29910	20856	2336	36	**469143**
Total	**40075**	**0**	**37965**	**756652**	**602779**	**235779**	**347180**	**103231**	**80472**	**6947**	**36**	**2211116**

Sprat	**1995**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	1463	0	1785	47432	20922	14973	17851	2676	741	14	0	**107857**
2qrt	1410	0	4496	40240	31732	152	5335	579	272	21	0	**84237**
3qrt	1703	0	1239	512	2986	1	5478	1605	903	646	0	**15073**
4qrt	5287	0	1148	18388	17384	15221	27955	5210	6225	69	0	**96887**
Total	**9863**	**0**	**8668**	**106572**	**73024**	**30347**	**56619**	**10070**	**8141**	**750**	**0**	**304054**

Sprat	**1996**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	3959	0	954	89218	77058	7396	40519	3167	2884	412	0	**225567**
2qrt	3507	0	306	41297	30407	1798	11104	1097	3141	810	0	**93467**
3qrt	338	0	138	1500	4268	0	7637	2492	3134	186	0	**19693**
4qrt	84	0	287	21491	21199	24464	13606	7863	11697	124	0	**100815**
Total	**7888**	**0**	**1685**	**153506**	**132932**	**33658**	**72866**	**14619**	**20856**	**1532**	**0**	**439542**

Sprat	**1997**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	350	0	513	103163	63617	14903	34755	8133	2884	124	0	**228442**
2qrt	129	0	2374	63414	31057	4163	15450	4241	3141	629	0	**124598**
3qrt	4057	0	28	4582	5812	24	8547	2316	3134	793	0	**29293**
4qrt	3922	0	2064	32517	24642	26197	21593	22096	11697	800	0	**145528**
Total	**8458**	**0**	**4979**	**203676**	**125128**	**45287**	**80345**	**36786**	**20856**	**2346**	**0**	**527861**

Sprat	**1998**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	50	0	1039	94033	34744	54739	22324	12212	2884	391	15	**222431**
2qrt	20	0	1609	49169	28867	6152	12494	7517	3141	1062	9	**110040**
3qrt	315	0	1842	6298	4287	4225	6736	3331	3134	698	10	**30876**
4qrt	2099	0	1641	23553	23441	24663	11665	6850	11697	185	2	**105796**
Total	**2484**	**0**	**6131**	**173053**	**91339**	**89779**	**53219**	**29910**	**20856**	**2336**	**36**	**469143**

Table 9.1.2. Annual and quarterly actches of herring in 1993-1998, t.

Herring	**Annual catches**									
	25	**26**	**27**	**28**	Riga	**29**	**32**	**30**	**31**	**Total**
1993	51508	34349	24387	33687	22160	27383	34145	39816	7902	**275337**
1994	59378	32495	20657	24307	24331	34347	32601	51396	4107	**283619**
1995	51656	28038	17680	24873	32642	25343	36899	61086	4681	**282898**
1996	44541	25102	6857	19970	32582	31257	35805	56642	5242	**257998**
1997	39862	25553	9424	16452	39844	31821	36361	65526	4281	**269124**
1998	49100	18458	25268	16605	28236	36972	31796	54815	5091	**266341**
Total	**296045**	**163995**	**104273**	**135894**	**179795**	**187123**	**207607**	**329281**	**31304**	**1635317**

Herring	**1993**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	7657	7985	4543	10164	5975	4993	5593	10543	65	**57518**
2qrt	14439	13208	5047	13207	7692	18757	14090	13745	4427	**104612**
3qrt	16893	5173	4328	583	1748	1893	3063	7178	3005	**43864**
4qrt	12519	7983	10469	9733	6745	1740	11399	8350	405	**69343**
Total	**51508**	**34349**	**24387**	**33687**	**22160**	**27383**	**34145**	**39816**	**7902**	**275337**

Herring	**1994**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	11932	5232	15686	6565	3224	2303	3645	9609	11	**58207**
2qrt	18406	11346	2285	7286	10102	27040	16489	21711	2318	**116983**
3qrt	15232	6599	268	1246	2689	1682	3645	12141	1446	**44948**
4qrt	13808	9318	2418	9210	8316	3322	8822	7935	332	**63481**
Total	**59378**	**32495**	**20657**	**24307**	**24331**	**34347**	**32601**	**51396**	**4107**	**283619**

Herring	**1995**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	7101	7727	12701	8625	11880	4486	13806 ?	?		**66326**
2qrt	12699	6952	911	8277	10663	17349	12600 ?	?		**69451**
3qrt	15605	5774	79	1769	2507	1734	4685 ?	?		**32153**
4qrt	16251	7585	3989	6202	7592	1774	5808 ?	?		**49201**
Total	**51656**	**28038**	**17680**	**24873**	**32642**	**25343**	**36899**	**61086**	**4681**	**282898**

Herring	**1996**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	12883	9464	1105	7836	4169	2785	4204	9138	13	**51597**
2qrt	8282	5815	1531	10242	12595	20263	17762	26796	3391	**106677**
3qrt	11370	3662	40	579	4964	4552	4561	14796	1485	**46009**
4qrt	12006	6161	4181	1313	10854	3657	9278	5912	353	**53715**
Total	**44541**	**25102**	**6857**	**19970**	**32582**	**31257**	**35805**	**56642**	**5242**	**257998**

Herring	**1997**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	6850	7750	1930	3772	8461	2766	8234	9370	0	**49133**
2qrt	13768	4861	3343	7100	12586	13370	10794	31737	2469	**100028**
3qrt	8389	5310	650	891	4536	2769	6007	15059	1475	**45086**
4qrt	10855	7632	3501	4689	14261	12916	11326	9360	337	**74877**
Total	**39862**	**25553**	**9424**	**16452**	**39844**	**31821**	**36361**	**65526**	**4281**	**269124**

Herring	**1998**									
	25	**26**	**27**	**28**	**Riga**	**29**	**32**	**30**	**31**	**Total**
1qrt	17656	6601	13307	5346	9603	10370	7738			**70621**
2qrt	13465	4249	1884	5132	10636	15702	10948			**62016**
3qrt	8129	3546	4067	2041	3148	3639	2318			**26888**
4qrt	9850	4062	6010	4086	4849	7261	10792			**46910**
Total	**49100**	**18458**	**25268**	**16605**	**28236**	**36972**	**31796**	**54815**	**5091**	**266341**

Table 9.1.3. Annual and quarterly catches of cod by Sub-divisions in 1993-1998, t.

COD	Annual catches										
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1993	7591	1275	6896	13408	21854	940	1552	51	11	257	2	**53837**
1994	10399	1628	16817	52716	30232	2888	2353	274	15	524	0	**117846**
1995	18177	611	13689	60300	13124	2766	3632	56	0	29	2	**112386**
1996	21417	4031	23101	74218	30713	3622	3178	18	1	185	0	**160484**
1997	21966	1886	18990	57579	26339	2567	2219	15	7	15	1	**131584**
1998	15094	3074	16041	37431	26631	1162	2066	30	12	5	1	**101547**
Total	**94644**	**12505**	**95534**	**295652**	**148893**	**13945**	**15000**	**444**	**46**	**1015**	**6**	**677684**

Cod	**1997**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	14699	985	6669	20056	6930	1419	696	2	5	0	1	**51462**
2qrt	2284	268	6566	19616	8461	901	453	8	1	12	0	**29452**
3qrt	1950	143	2540	7818	4172	53	248	3	1	2	0	**16930**
4qrt	3033	490	3215	10089	6776	194	822	2	0	1	0	**24622**
Total	**21966**	**1886**	**18990**	**57579**	**26339**	**2567**	**2219**	**15**	**7**	**15**	**1**	**131584**

Cod	**1998**											
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**32**	**30**	**31**	**Total**
1qrt	7221	1681	4597	8648	6707	561	293	2	5	0	0	**29715**
2qrt	1780	205	2455	10941	8674	364	253	26	6	3	0	**20267**
3qrt	1918	234	3153	6376	3489	66	383	2	1	2	0	**15624**
4qrt	4175	954	5836	11466	7761	171	1137	0	0	0	1	**31501**
Total	**15094**	**3074**	**16041**	**37431**	**26631**	**1162**	**2066**	**30**	**12**	**5**	**1**	**101547**

Table 9.1.4. Catches of juvenile sprat in sub-divisions 25 and 26 in 1993-1998.
For the years 1993 and 1994 the sum of Sub-divisions 25,26 and 28 is presented.

SD 25

Year		0	1	2	3	4	5	6	7	8	9	10	Total
1993	CANUM	46.1	1429.2	1382.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2857.8**
	%	0.4	11.9	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**23.8**
1994	CANUM	190.1	846.5	2095.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3131.9**
	%	0.9	4.0	9.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**14.8**
1995	CANUM	39.6	1469.9	189.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1698.5**
	%	0.5	17.3	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**20.0**
1996	CANUM	0.1	3737.1	2499.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**6237.0**
	%	0.0	20.4	13.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**34.1**
1997	CANUM	338.8	228.0	2390.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2957.4**
	%	1.7	1.2	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**15.1**
1998	CANUM	0.6	3376.0	366.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3743.5**
	%	0.0	16.1	1.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**17.8**

SD 26

Year		0	1	2	3	4	5	6	7	8	9	10	Total
1995	CANUM	382.0	1409.0	218.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2009.1**
	%	5.1	19.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**27.0**
1996	CANUM	23.0	3081.0	2603.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**5707.8**
	%	0.1	18.2	15.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**33.7**
1997	CANUM	318.2	283.3	1453.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2055.2**
	%	2.5	2.2	11.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**16.1**
1998	CANUM	53.0	3299.0	253.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**3605.5**
	%	0.4	27.9	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**30.5**

Table 9.1.5 Catches of juvenile sprat in sub-divisions 25 and 26 in I and II quarters in 1993-1998.
For the years 1993 and 1994 the sum of Sub-divisions 25,26 and 28 is presented.

SD 25

Year		0	1	2	3	4	5	6	7	8	9	10	Total
1993	CANUM	0.0	662.4	1018.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1680.9**
	%	0.0	7.8	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**19.9**
1994	CANUM	0.0	342.7	1523.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1865.8**
	%	0.0	2.1	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**11.5**
1995	CANUM	0.0	1174.0	140.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1314.0**
	%	0.0	16.2	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**18.2**
1996	CANUM	0.0	3542.0	2346.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**5888.2**
	%	0.0	21.5	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**35.7**
1997	CANUM	0.0	98.4	1890.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1988.6**
	%	0.0	0.6	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**12.8**
1998	CANUM	0.0	2309.0	263.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2572.4**
	%	0.0	14.1	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**15.7**

SD 26

Year		0	1	2	3	4	5	6	7	8	9	10	Total
1995	CANUM	0.0	513.6	147.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**661.1**
	%	0.0	11.1	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**14.3**
1996	CANUM	0.0	620.5	2315.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2935.8**
	%	0.0	4.9	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**23.2**
1997	CANUM	0.0	138.1	1117.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**1255.8**
	%	0.0	1.4	11.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**12.5**
1998	CANUM	0.0	2084.0	148.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**2232.2**
	%	0.0	25.1	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**26.8**

Table 9.1.6. Catches of juvenile herring and sprat in sub-divisions 25 and 32 in 1993-1998.

SD 25

Year		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
1993	CANUM	19.8	105.1	46.6	17.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**188.9**
	%	0.8	4.1	1.8	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.3
1994	CANUM	3.4	64.3	49.0	19.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**136.3**
	%	0.3	6.0	4.6	1.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7
1995	CANUM	12.5	187.9	37.1	25.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**262.6**
	%	1.1	16.1	3.2	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.5
1996	CANUM	17.1	17.4	8.8	3.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**47.1**
	%	3.4	3.4	1.7	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3
1997	CANUM	21.2	55.1	35.8	32.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**144.1**
	%	2.1	5.5	3.6	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.4
1998	CANUM	9.0	270.3	46.9	31.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**357.4**
	%	0.6	19.4	3.4	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	25.6

SD 30

Year		**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Total**
1993	CANUM	0.0	196.9	229.8	65.1	14.6	0.0	0.0	0.0	0.0	0.0	0.0	**506.3**
	%	0.0	14.0	16.4	4.6	1.0	0.0	0.0	0.0	0.0	0.0	0.0	36.1
1994	CANUM	0.0	74.7	251.2	113.8	10.4	0.0	0.0	0.0	0.0	0.0	0.0	**450.0**
	%	0.0	4.3	14.6	6.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	26.1
1995	CANUM	0.0	60.1	158.0	166.6	15.2	0.0	0.0	0.0	0.0	0.0	0.0	**400.0**
	%	0.0	3.2	8.4	8.8	0.8	0.0	0.0	0.0	0.0	0.0	0.0	21.2
1996	CANUM	0.0	84.4	286.4	83.3	15.7	0.0	0.0	0.0	0.0	0.0	0.0	**469.7**
	%	0.0	4.6	15.7	4.6	0.9	0.0	0.0	0.0	0.0	0.0	0.0	25.8
1997	CANUM	0.0	156.2	320.9	153.0	12.8	0.0	0.0	0.0	0.0	0.0	0.0	**642.8**
	%	0.0	7.1	14.6	6.9	0.6	0.0	0.0	0.0	0.0	0.0	0.0	29.2
1998	CANUM	0.0	212.4	166.3	98.7	13.3	0.0	0.0	0.0	0.0	0.0	0.0	**490.7**
	%	0.0	11.8	9.2	5.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	27.2

Table 9.2.1.1. The percentage of immature Baltic sprat (SD 22-32) in sprat fishery, according to years 1974-1998

Year	Total catch in numbers (millions)	The percentage (by numbers)			
		Age groups			
		0	1	2	Total
1974	18731.0	0.18	13.96	9.89	24.02
1975	13311.0	0.94	4.72	4.58	10.24
1976	13691.0	1.57	34.20	1.79	37.56
1977	16420.0	0.63	14.44	15.35	30.42
1978	11100.0	0.87	4.50	8.99	14.36
1979	6114.0	0.83	21.92	2.93	25.68
1980	4489.0	0.78	8.22	9.86	18.86
1981	4475.0	0.58	51.46	6.17	58.21
1982	3900.0	0.62	9.31	18.92	28.85
1983	3117.0	3.37	59.42	2.86	65.64
1984	4516.0	1.68	22.25	15.90	39.83
1985	5687.0	1.14	9.95	8.98	20.08
1986	5787.0	0.55	8.55	5.92	15.03
1987	6584.0	0.06	11.83	1.80	13.69
1988	6562.8	2.76	1.19	12.32	16.27
1989	6350.0	1.85	33.10	1.37	36.32
1990	6404.0	1.09	16.38	14.85	32.33
1991	7917.1	4.95	13.18	10.04	28.17
1992	10938.0	4.53	16.29	8.06	28.88
1993	14358.5	0.33	12.76	11.88	24.97
1994	24882.0	2.22	4.34	9.85	16.40
1995	29073.3	2.67	21.92	2.42	27.00
1996	53271.7	0.13	15.75	15.59	31.47
1997	63337.7	3.12	2.71	10.98	16.82
1998	58741.6	0.38	18.76	1.94	21.08

Table 9.2.1.2. The percentage (by numbers) of immature sprat in sprat fishery, according to years (1997-1999) and ICES Sub-divisions

Year	ICES Sub-divisions									
	22	24	25	26	27	28	29	30	31	32
1997	79.4	59.2	14.7	16.9	19.8	14.8	15.6	10.2	5.6	12.7
1998	87.4	15.0	17.8	30.5	5.9	29.6	22.7	6.5	7.8	35.4
1999*		11.9	4.6	16.5						

*) data from the Polish fisheries only, calculated using new data on maturity ogive (SD 24 and 25 - 52% in 1 age group, and 6% in 2 age group, SD 26 - 45% in 1 age group, and 28% in 2 age group; data by W. Grygiel - SFI Gdynia)

Table 9.2.1.3. The percentage of immature Baltic herring (SD 25-29, 32 exc. the Gulf of Riga) in herring fishery, according to years 1974-1998

Year	Total catch in numbers (millions)	The percentage (by numbers)				
		Age groups				
		0	1	2	3	Total
1974	9481	0.28	28.89	5.88	1.47	36.52
1975	8742	0.64	22.58	6.15	1.94	31.31
1976	8282	0.25	30.42	4.90	1.69	37.25
1977	7576	0.26	17.53	10.74	1.21	29.74
1978	6538	1.32	17.68	6.41	3.03	28.43
1979	5815	0.88	8.29	7.08	1.68	17.92
1980	5656	1.43	20.12	5.48	1.90	28.94
1981	6230	1.09	22.28	8.17	1.27	32.81
1982	5988	1.10	15.81	11.89	1.55	30.35
1983	6628	0.47	11.98	8.71	3.04	24.19
1984	6279	0.96	13.79	6.35	2.45	23.55
1985	7463	0.40	16.90	9.68	1.72	28.69
1986	6559	0.00	8.57	8.42	2.82	19.80
1987	6386	0.16	15.50	3.64	2.44	21.74
1988	6673	0.57	7.19	10.29	1.29	19.34
1989	7050	1.74	12.11	2.50	3.52	19.88
1990	5967	0.76	12.26	6.43	1.09	20.54
1991	6234	1.84	7.90	8.69	2.21	20.64
1992	7182	2.78	17.59	6.18	2.88	29.42
1993	8287	1.41	12.29	8.09	2.17	23.96
1994	7864	2.17	8.28	5.44	2.45	18.35
1995	8530	0.82	12.34	4.49	2.47	20.12
1996	8678	0.90	16.30	6.54	1.59	25.33
1997	9418	1.67	8.00	7.27	2.44	19.37
1998	9917	0.92	21.30	3.72	2.33	28.28

Table 9.2.1.4. The percentage (by numbers) of immature herring in herring fishery, according to ICES Sub-divisions

Year	ICES Sub-divisions						Total
	25	26	27	28	29	32	
1997	14.4	24.0	4.3	11.4	17.0	24.9	19.0
1998	25.6	28.7	6.5	16.8	29.6	45.8	29.5

Table 9.2.2.1. The percentage of juvenile herring and sprat in different types of the Polish fishery (research survey, commercial, industrial), data from SD 26, I quarter of 1998

Date	Type of catches	Juvenile fish [% of weight]	
		sprat	herring
Catches conducted below the parallel 54°50'N - shallow waters			
07.01.98	consumption	3.4	
16.01.98	research	30.0	
21.01.98	research	25.9	
02.02.98	research	1.5	9.0
02.02.98	research	47.9	0.3
03.02.98	research	27.4	33.6
03.02.98	research	17.1	33.6
Catches conducted on the parallel 54°50'N and above - open sea waters			
15.01.98	consumption	0.0	77.6
03.02.98	research	58.4	5.8
04.02.98	research	2.2	1.1
06.02.98	research	6.1	2.4
13.02.98	industrial	63.3	?
13.02.98	industrial	61.5	?
14.02.98	industrial	54.7	?
14.02.98	consumption	25.2	19.8
20.02.98	industrial	20.0	
22.02.98	industrial	18.0	
24.02.98	consumption	10.7	16.7
25.02.98	consumption	10.4	2.0
25.02.98	consumption	20.4	0.9
25.02.98	consumption	9.3	2.0
25.02.98	consumption	5.1	0.0
04.03.98	consumption	0.7	33.4
08.03.98	consumption	4.1	9.1

Table 9.2.2.2. The percentage of juvenile herring and sprat in the Polish consumpti catches of sprat in IV quarter of the years 1995-1997; data for ICES Sub-division 2

Year	No. of samples		Juvenile fish [% of weight]	
	herring	sprat	herring	sprat
Catches conducted below the parallel 54°50'N - shallow waters				
1995	3	3	12.9	24.8
1996	6	7	18.3	11.9
1997	6	9	10.2	21.0
Catches conducted on the parallel 54°50'N and above - open sea waters				
1995	9	18	6.8	1.8
1996	19	25	6.0	2.0
1997	15	26	7.0	8.5

Table 9.2.2.3. The percentage of juvenile herring in Polish landings of sprat in ICES Sub-division 26 in the years 1995-1999

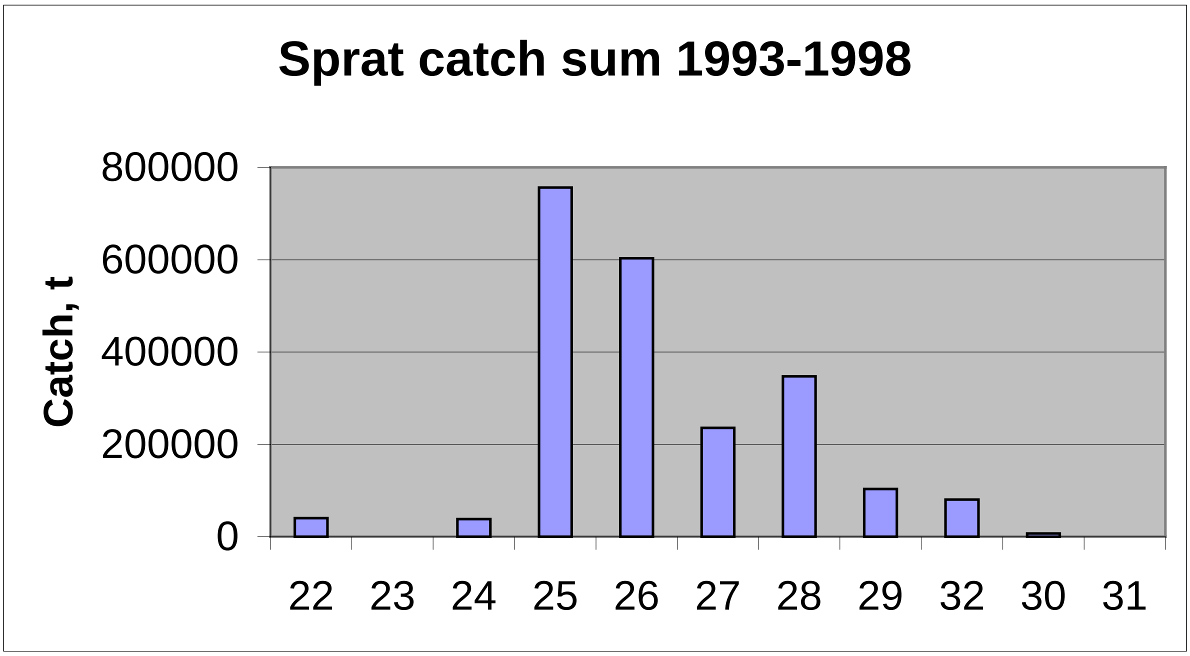
Year	1995			1996			1997			1998			
Months	Nominal catch of sprat [t]	juvenile herring [t]	juvenile herring [%]	Nominal catch sprat [t]	juvenile herring [t]	juvenile herring [%]	Nominal catch sprat [t]	juvenile herring [t]	juvenile herring [%]	Nominal catch sprat [t]	juvenile herring [t]	juvenile herring [%]	Nominal catch sprat [t]
I	2077	91	4.4	4717	290	6.1	9511	517	5.4	1869	123.0	6.6	3318
II	2773	136	4.9	5245	286	5.5	9035	406	4.5	6889	456.0	6.6	5150
III	4105	190	4.6	9642	1000	10.4	18954	843	4.4	8590	521.2	6.1	12169
IV	4386	186	4.2	6867	355	5.2	14912	627	4.2	5948	353.8	5.9	5902
V	3673	171	4.7	4473	239	5.3	2860	129	4.5	2412	138.7	5.8	3580
VI	854	36	4.2	1147	64	5.6	872	62	7.1	629	25.1	4.0	270
VII	239	19	7.9	956	52	5.4	707	26	3.7	656	57.0	8.7	373
VIII	201	26	12.9	338	20	5.9	607	22	3.6	202	6.1	3.0	489
IX	450	16	3.6	811	42	5.2	806	33	4.1	576	54.6	9.5	424
X	809	68	8.4	2413	165	6.8	648	71	11.0	817	41.2	5.0	670
XI	1063	152	14.3	4733	392	8.3	5604	571	10.2	1376	106.2	7.7	2742
XII	2279	193	8.5	3988	548	13.7	4669	382	8.2	872	119.7	13.7	2025
Total/Average	22909	1284	5.6	45330	3453	7.6	69185	3689	5.3	30835	2002.6	6.5	37112

Table 9.2.2.4. The percentage of juvenile herring in the Polish sprat landings in ICES Sub-division 26, according to quarters 1995-1999

Year	1995		1996		1997		1998		1999		Average	
Quarter	Juvenile herring		Juvenile herring		Juvenile herring		Juvenile herring		Juvenile herring		Juvenile herring	
	[t]	[%]	[t]	[%]	[t]	[%]	[t]	[%]	[t]	[%]	[t]	[%]
I	417	32.5	1576	45.6	1766	47.9	1100.3	54.9	2155.4	60.8	1402.94	50.2
II	393	30.6	658	19.1	818	22.2	517.6	25.8	844.5	23.8	646.22	23.1
III	61	4.7	114	3.3	81	2.2	117.6	5.9	65.2	1.8	87.76	3.1
IV	413	32.2	1105	32	1024	27.7	267.1	13.3	481.1	13.6	658.04	23.5
Total	1284	100	3453	100	3689	100	2002.6	100	3546.2	100	2794.96	100
Sprat landings [t]	22909		45330		69185		30835		37112		41074	
Juvenile herring [%]		5.6		7.6		5.3		6.5		9.6		6.8

Table 9.2.3.1. The percentage (by weight) of undersized cod taken in the Polish small mesh fisheries in 1998

	Combined bottom and pelagic hauls	Pelagic hauls	Hauls on bottom below the depth of 50 meters	Hauls on bottom above the depth of 50 meters
Undersized cod in total catch of herring and sprat	0.16	0.03	2.06	0.08



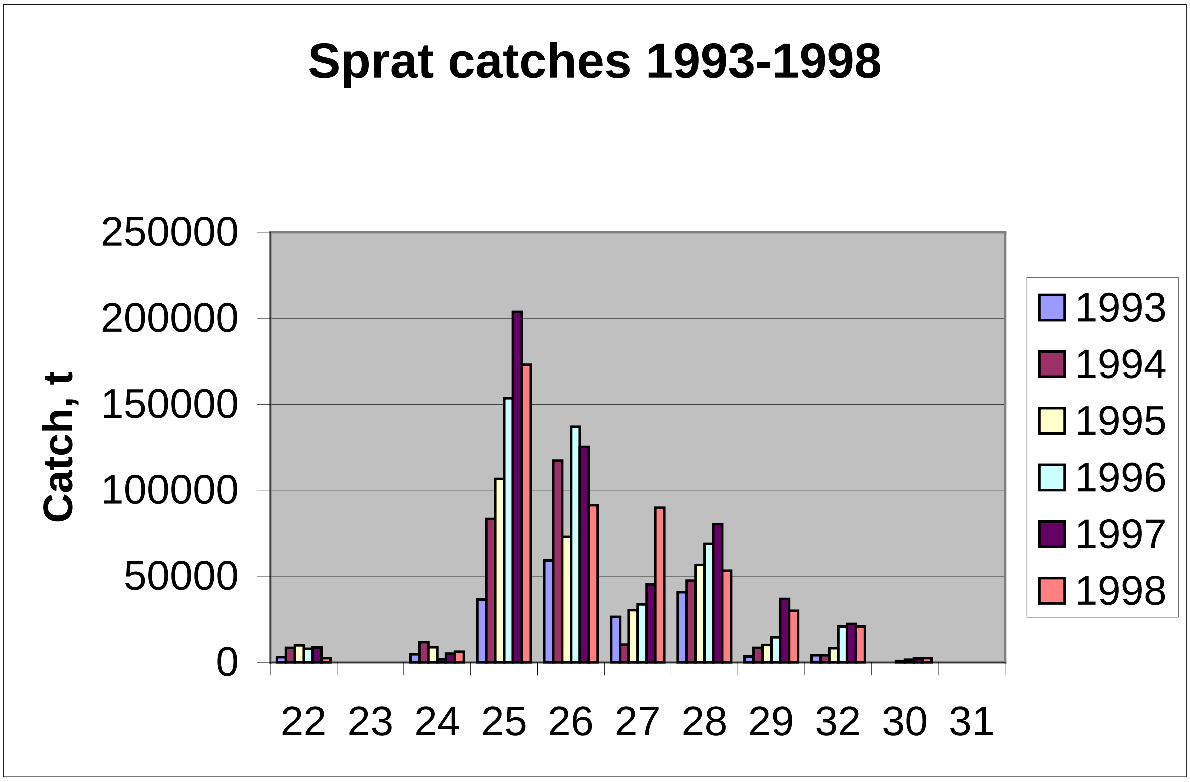
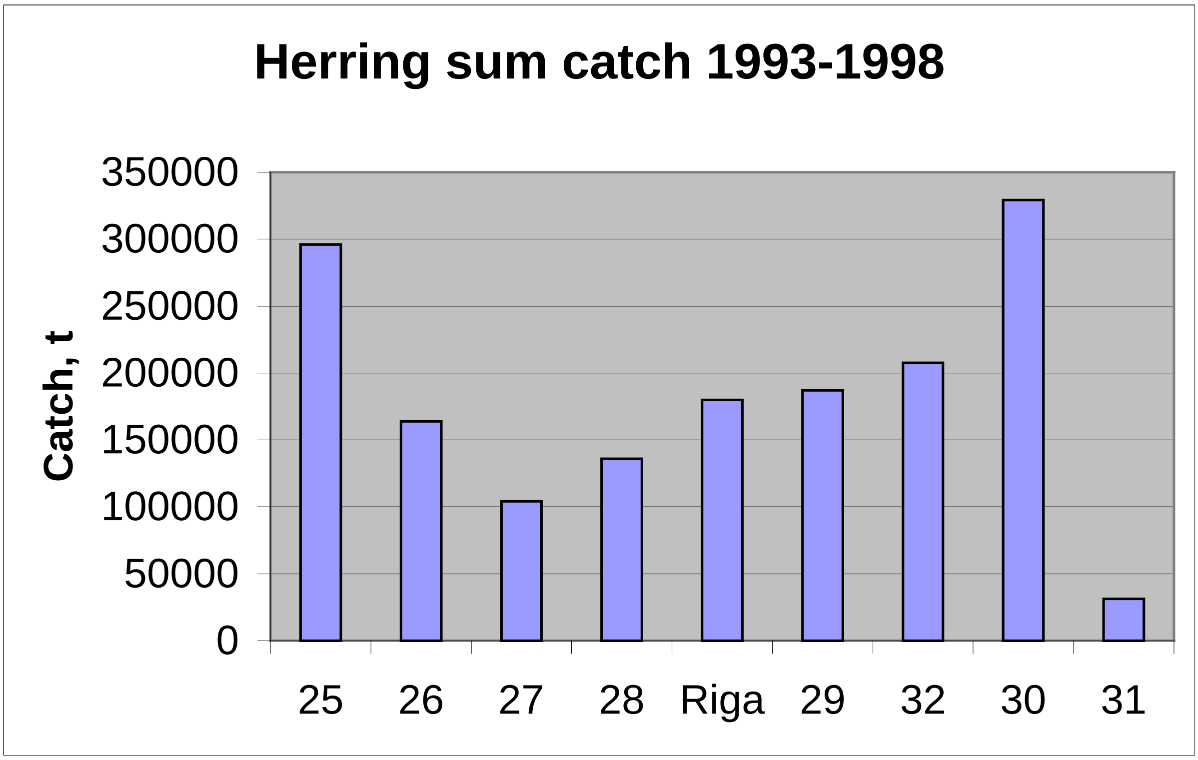


Figure 9.1.1. Sprat catch distribution by Sub-divisions in 1993-1998.



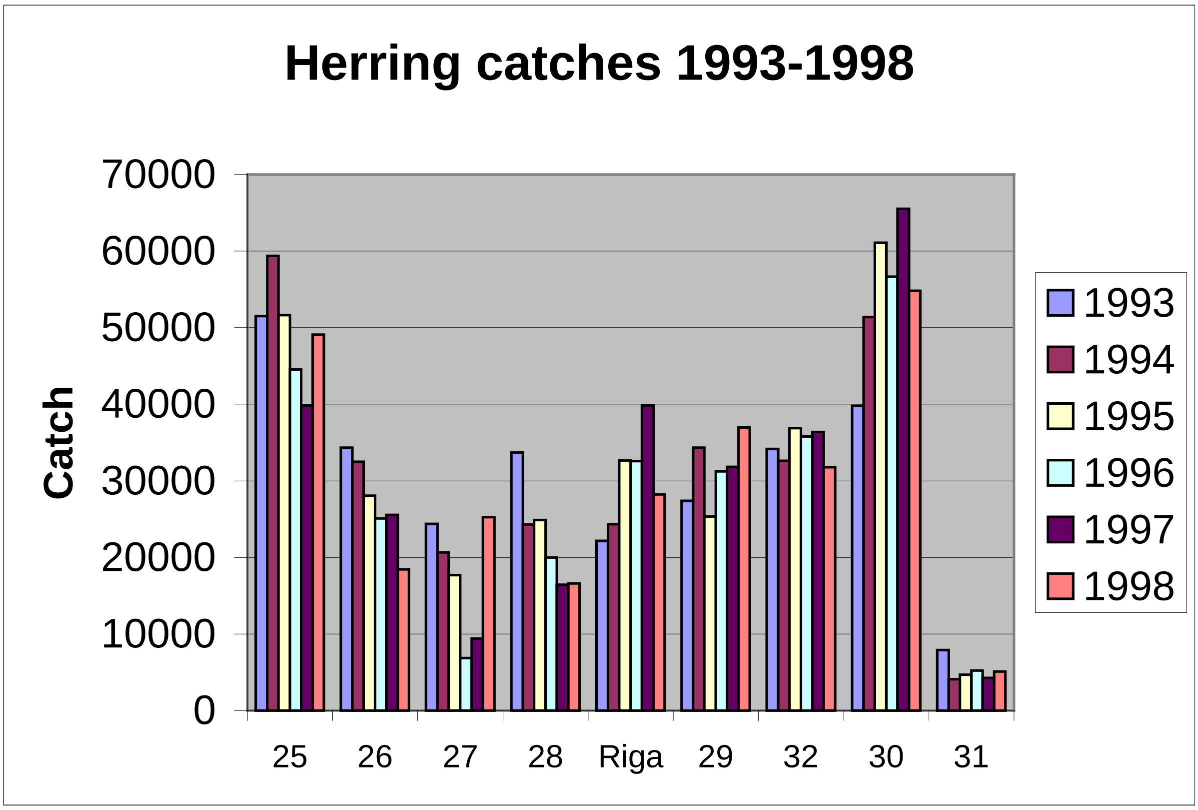
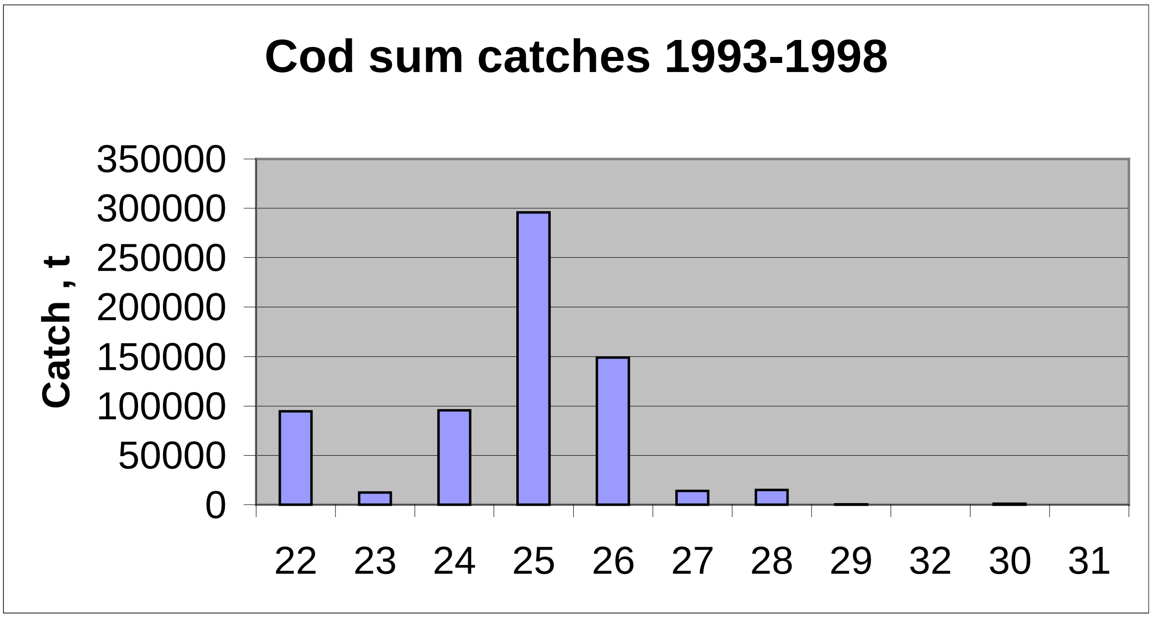


Figure 9.1.2. Herring catch distribution by Sub-divisions in 1993-1998.



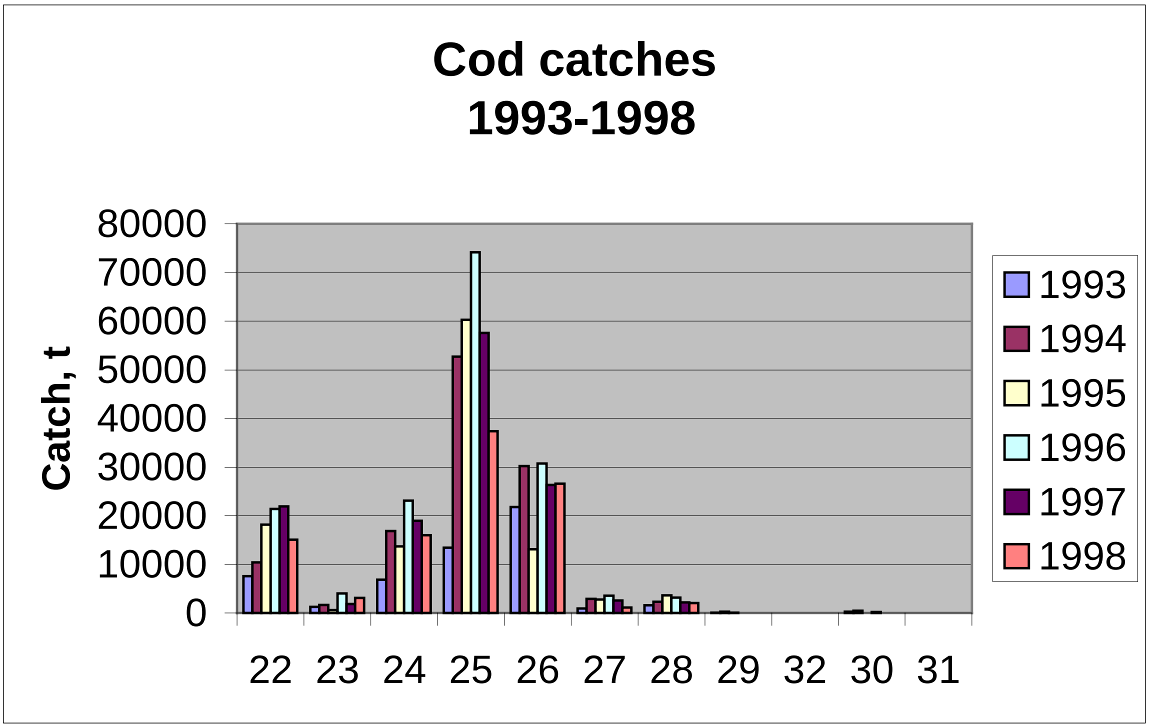
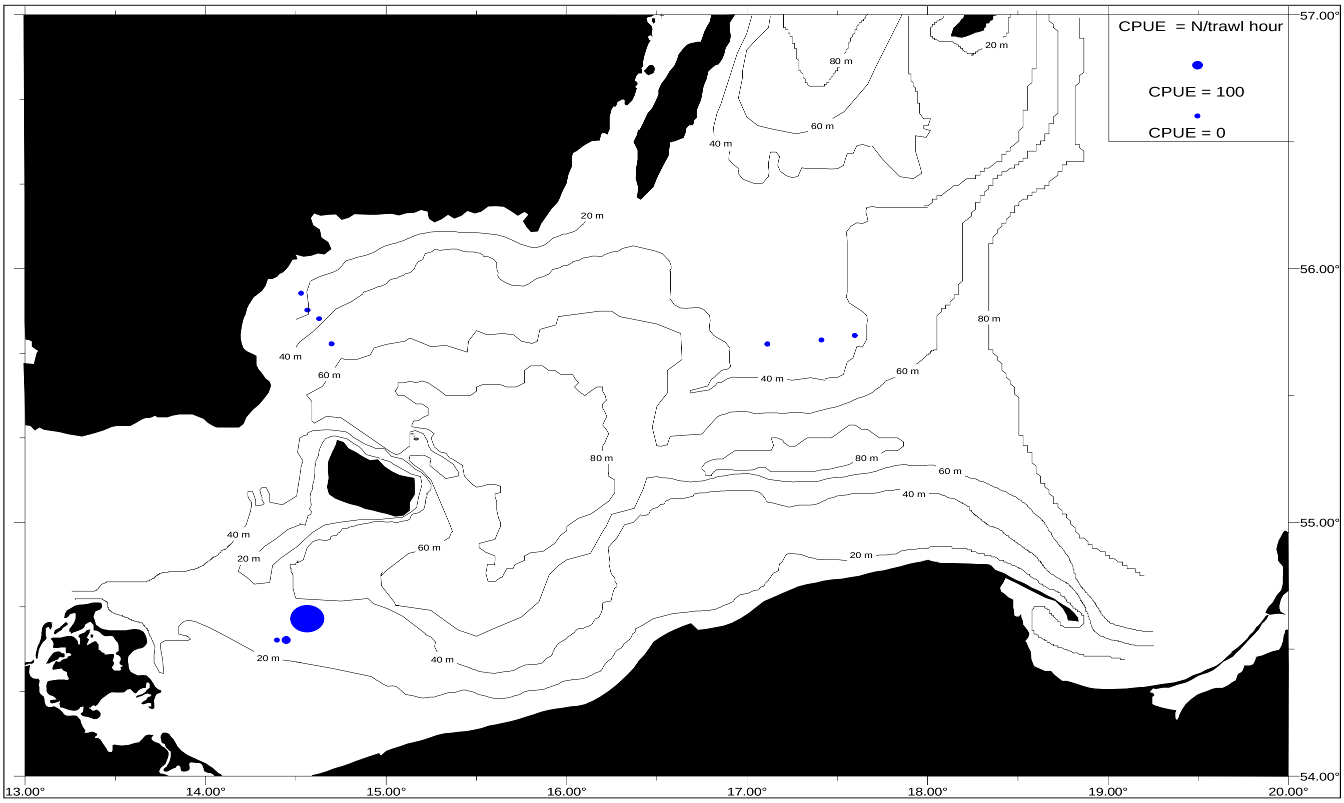
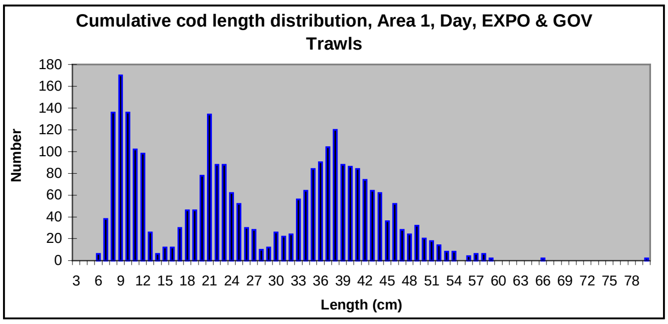


Figure 9.1.3. Cod catch distribution by Sub-divisions in 1993-1998.





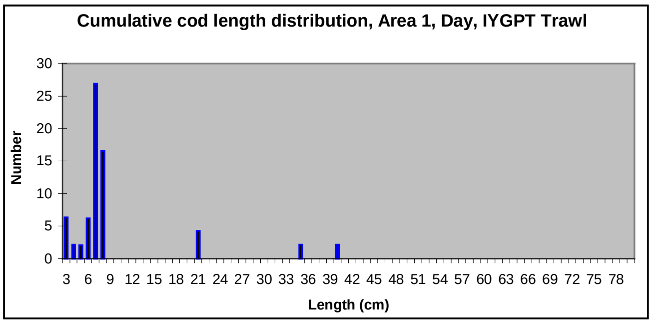
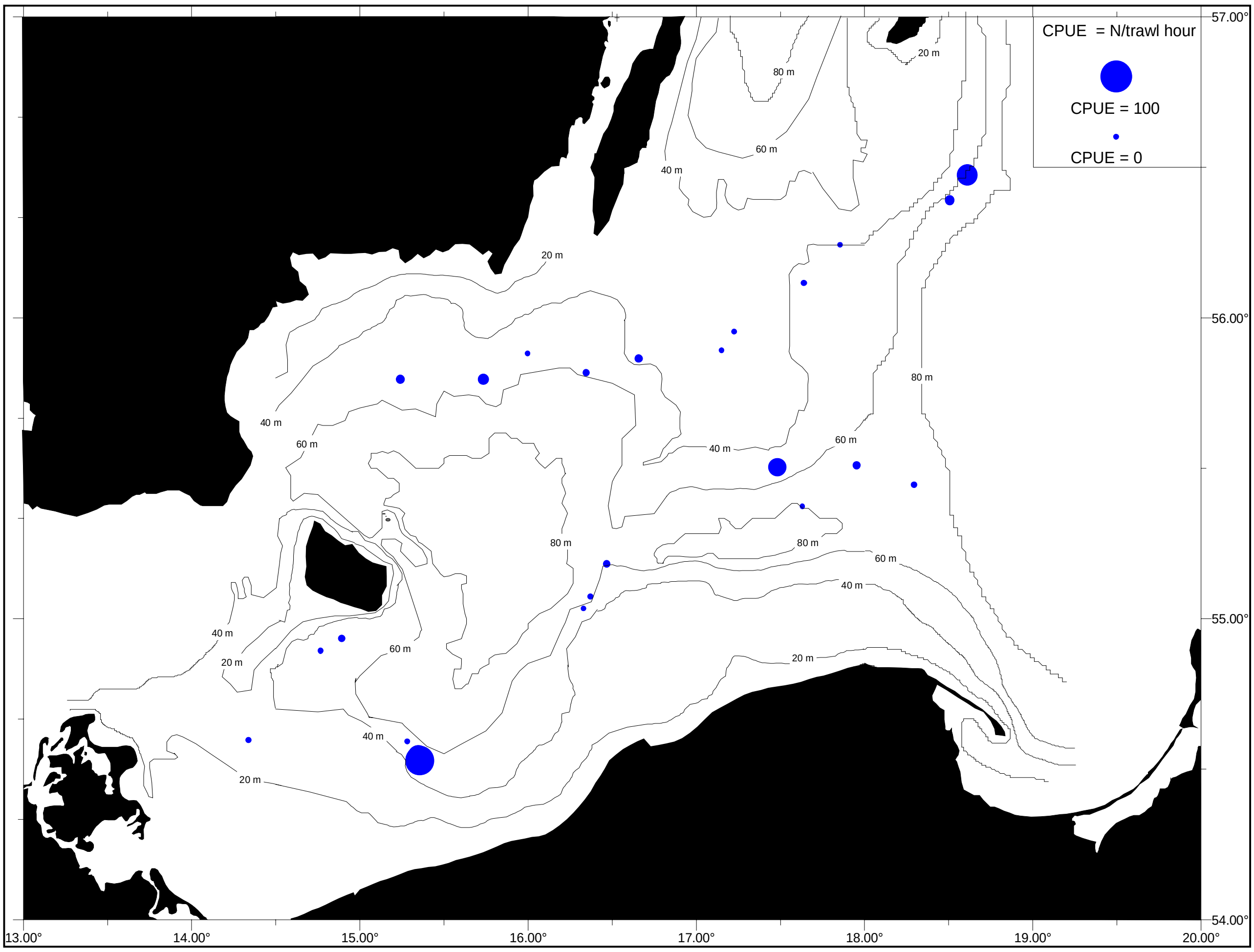


Figure 9.2.4.1 Geographical density distribution of juvenile cod (TTL < 12 cm) and length distribution of all caught cod in the Central Baltic Sea in September/October 1994 during day time: Day time CPUE (number per 1 trawl hour) for DANA Survey 10 1994 (DS1094) with GOV, EXPO, and IYGPT trawls, respectively, of juvenile cod. Normalised and pooled length distribution: Normalised to number caught per 1 trawl hour (CPUE) at each station for all length groups and then pooled for all stations.



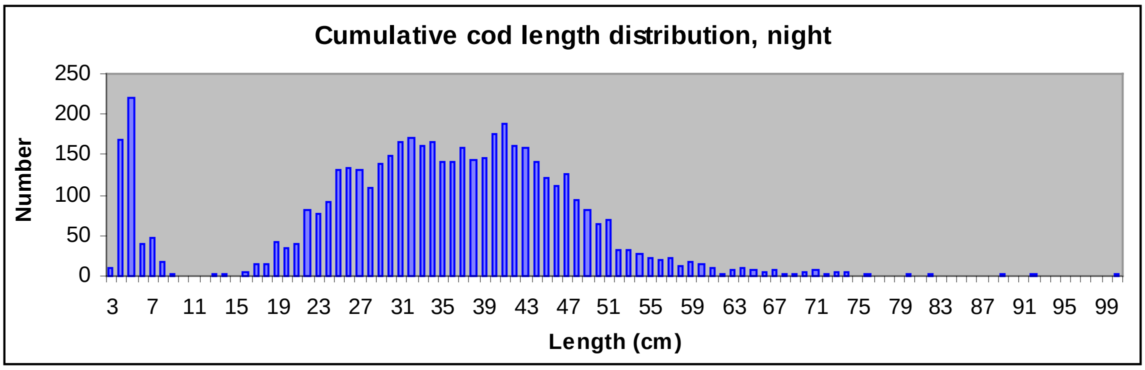
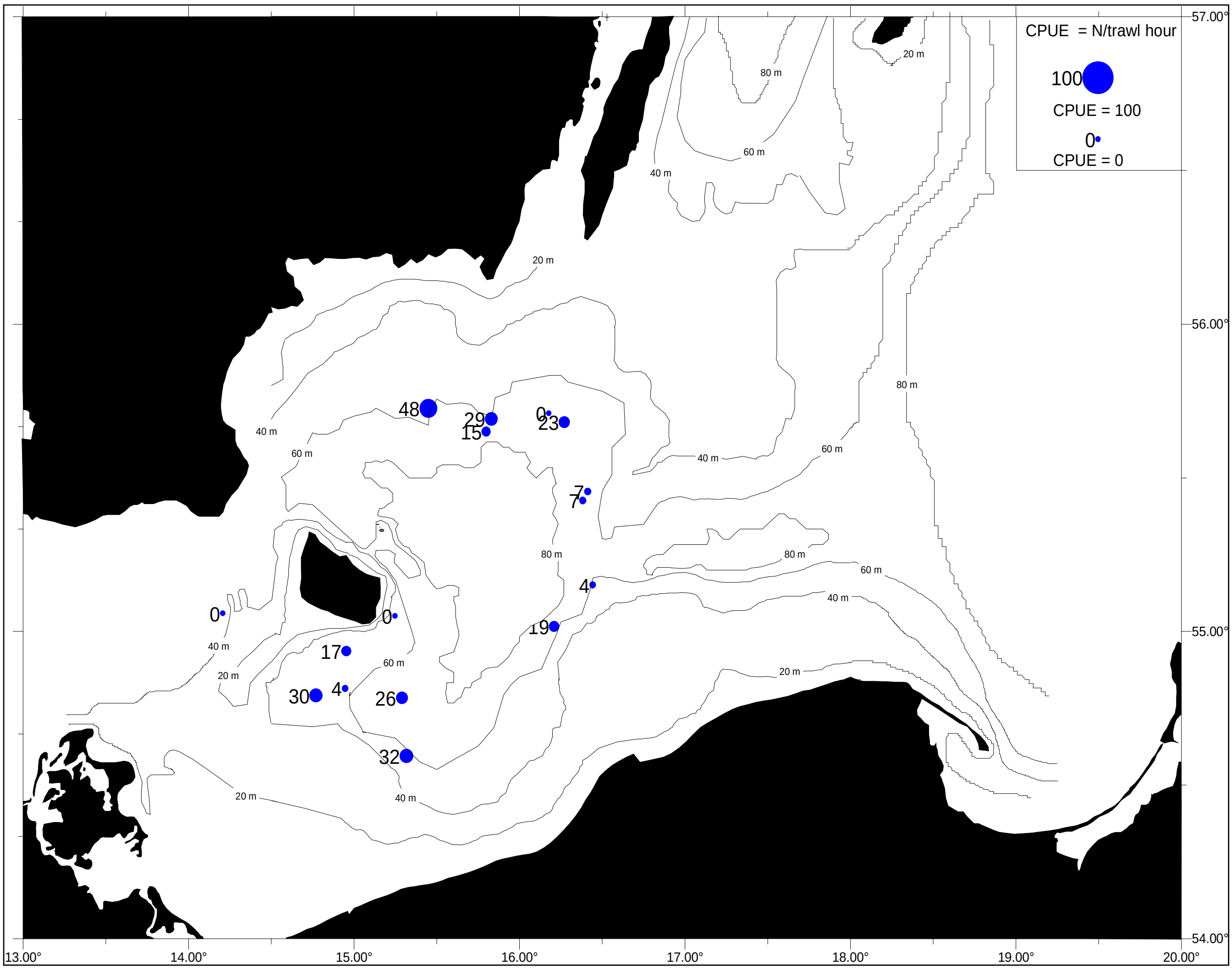


Table 9.2.4.2 Geographical density distribution of juvenile cod (TTL < 11cm) and length distribution of all caught cod in the Central Baltic Sea in December 1995 during night time: Night time CPUE (number per 1 trawl hour) for DANA Survey 11 1995 (DS1195) with EXPO- trawl of juvenile cod. Normalised and pooled length distribution: Normalised to number caught per 1 trawl hour (CPUE) at each station for all length groups and then pooled for all stations.



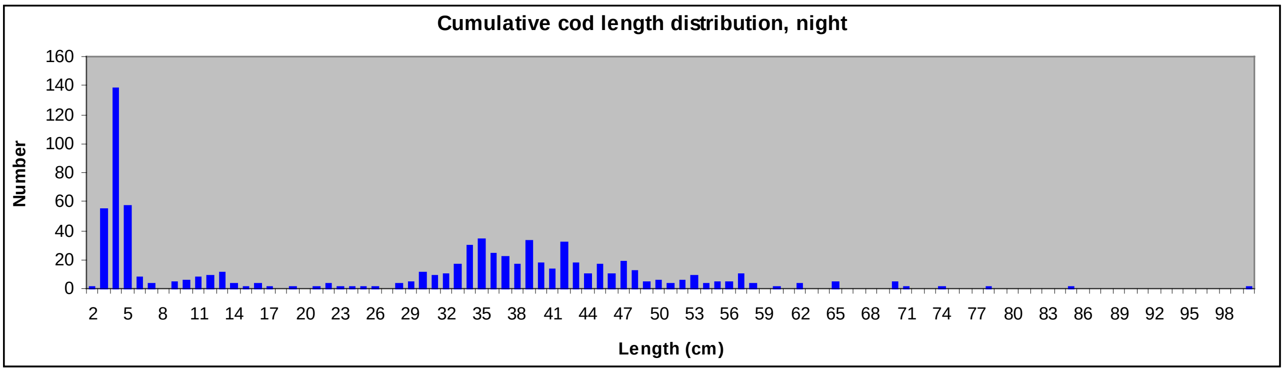
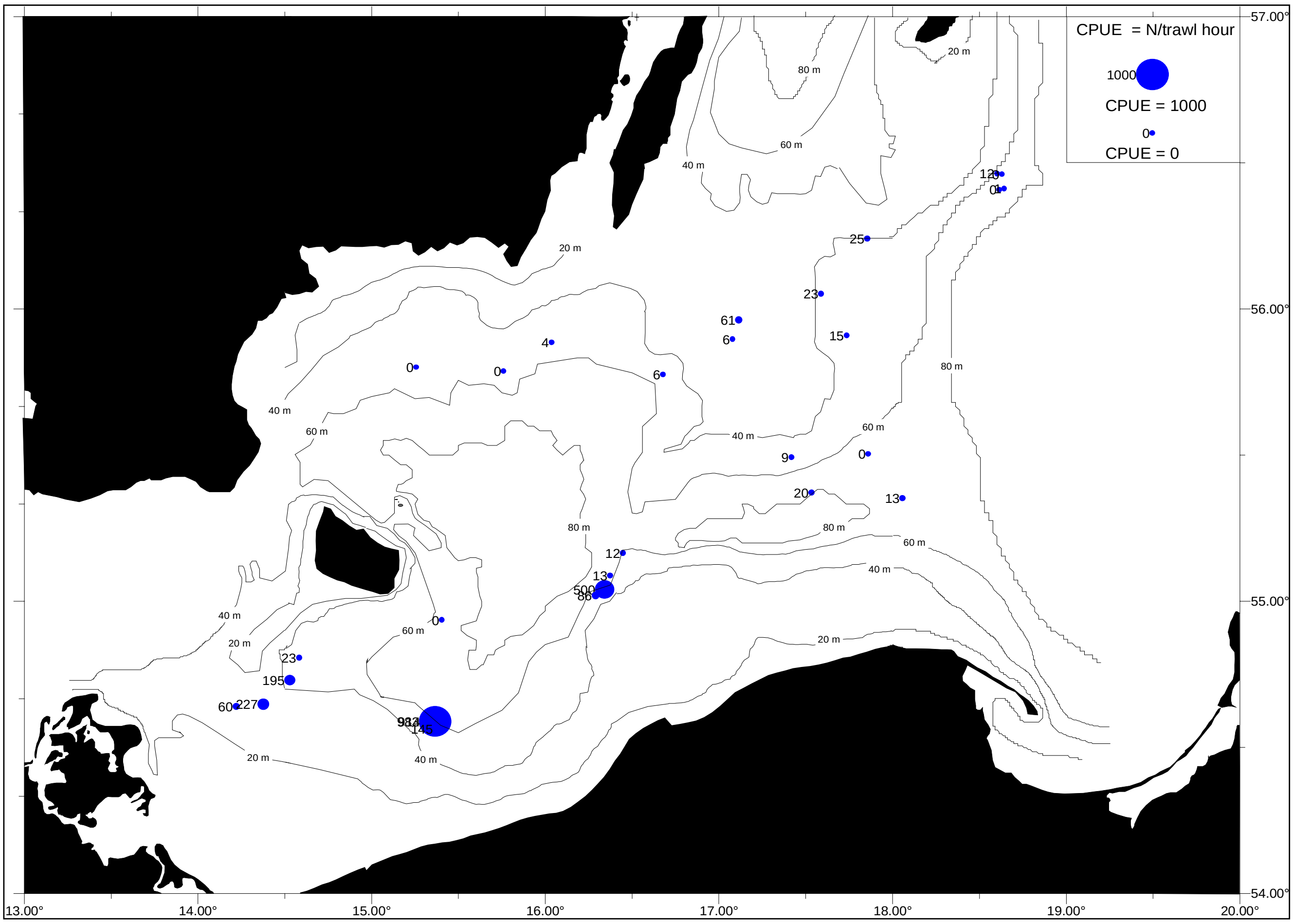


Figure 9.2.4.3 Geographical density distribution of juvenile cod (TTL < 8 cm) and length distribution of all caught cod in the Central Baltic Sea in November 1996 during night time: Night time CPUE (number per 1 trawl hour) for DANA Survey 14 1996 (DS1496) with EXPO-and GOV-trawl of juvenile cod. Normalised and pooled length distribution: Normalised to number caught per 1 trawl hour (CPUE) at each station for all length groups and then pooled for all stations.



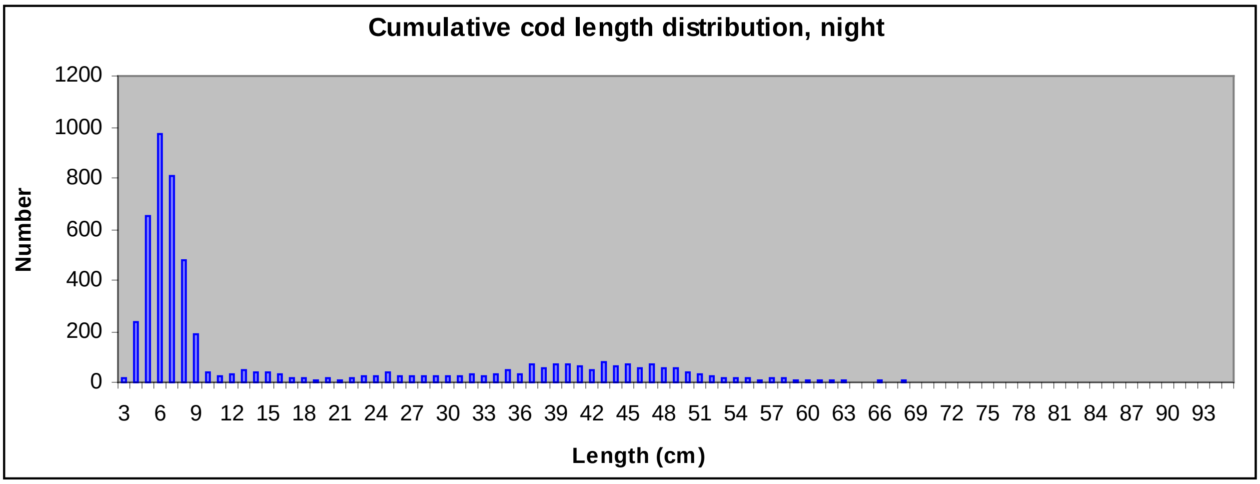
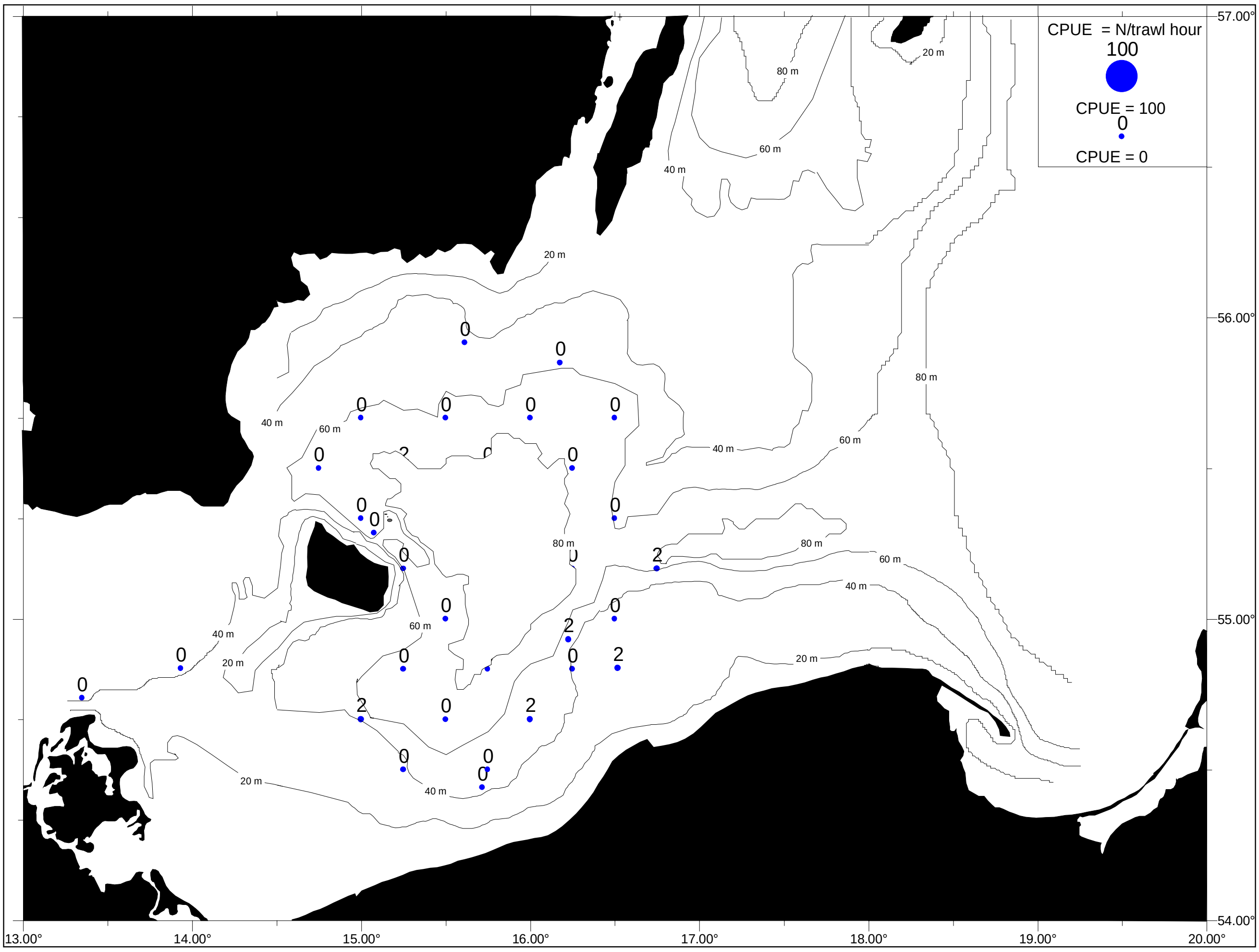


Figure 9.2.4.4 Geographical density distribution of juvenile cod (TTL < 12cm) and length distribution of all caught cod in the Central Baltic Sea in January 1997 during night time: Night time CPUE (number per 1 trawl hour) for DANA Survey 01 1997 (DS0197) with EXPO- trawl of juvenile cod. Normalised and pooled length distribution: Normalised to number caught per 1 trawl hour (CPUE) at each station for all length groups and then pooled for all stations.



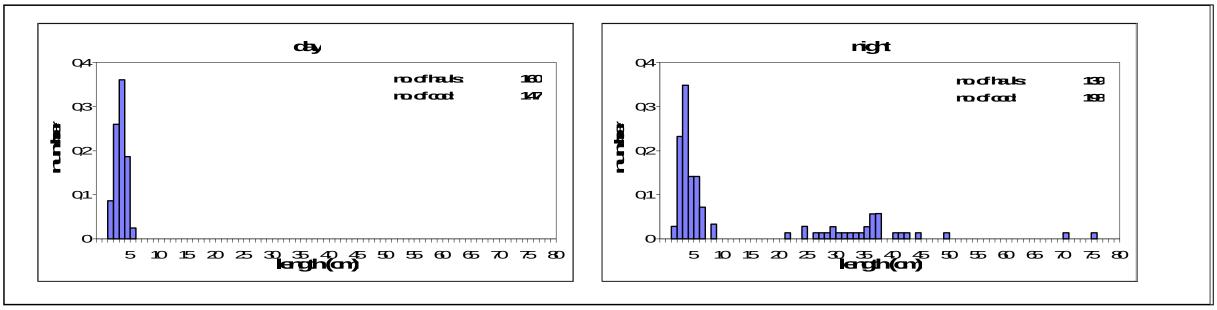
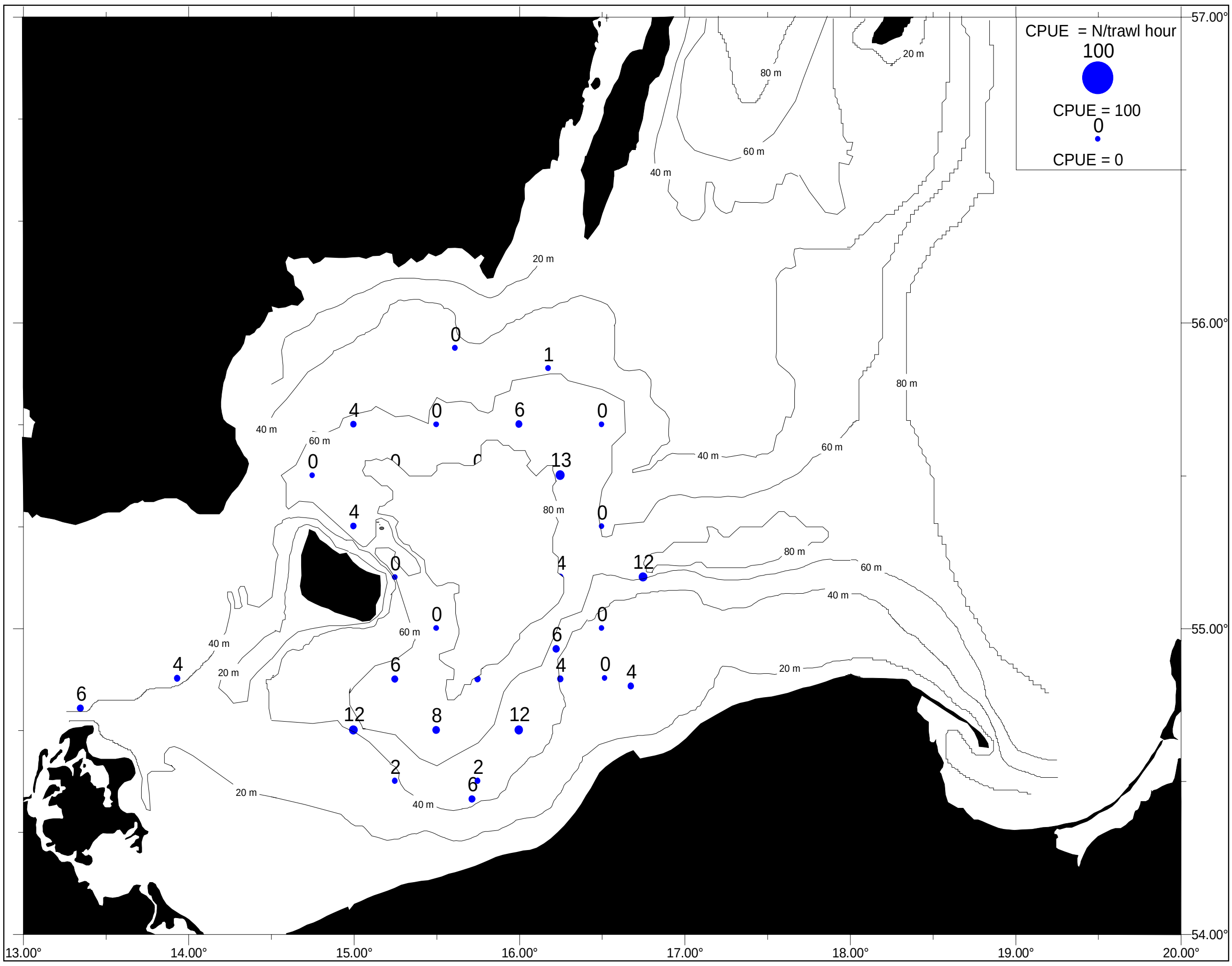


Figure 9.2.4.5 Geographical density distribution of juvenile cod (TTL < 16 cm) and length distribution of all caught cod in the Central Baltic Sea in September 1996 during night and day time: Night and Day time CPUE (number per 1 trawl hour) for Solea Survey 396 1996 (SO0996) with IKMT-trawl of juvenile cod. Length distribution for all cod caught during day and night fishery, respectively, at all IKMT-trawl stations summed up for all Solea surveys performed in the period 1993 to 1996.



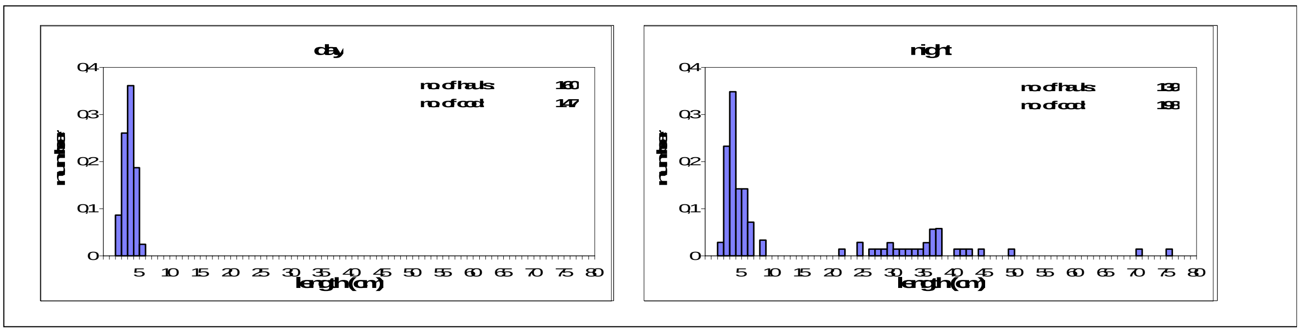
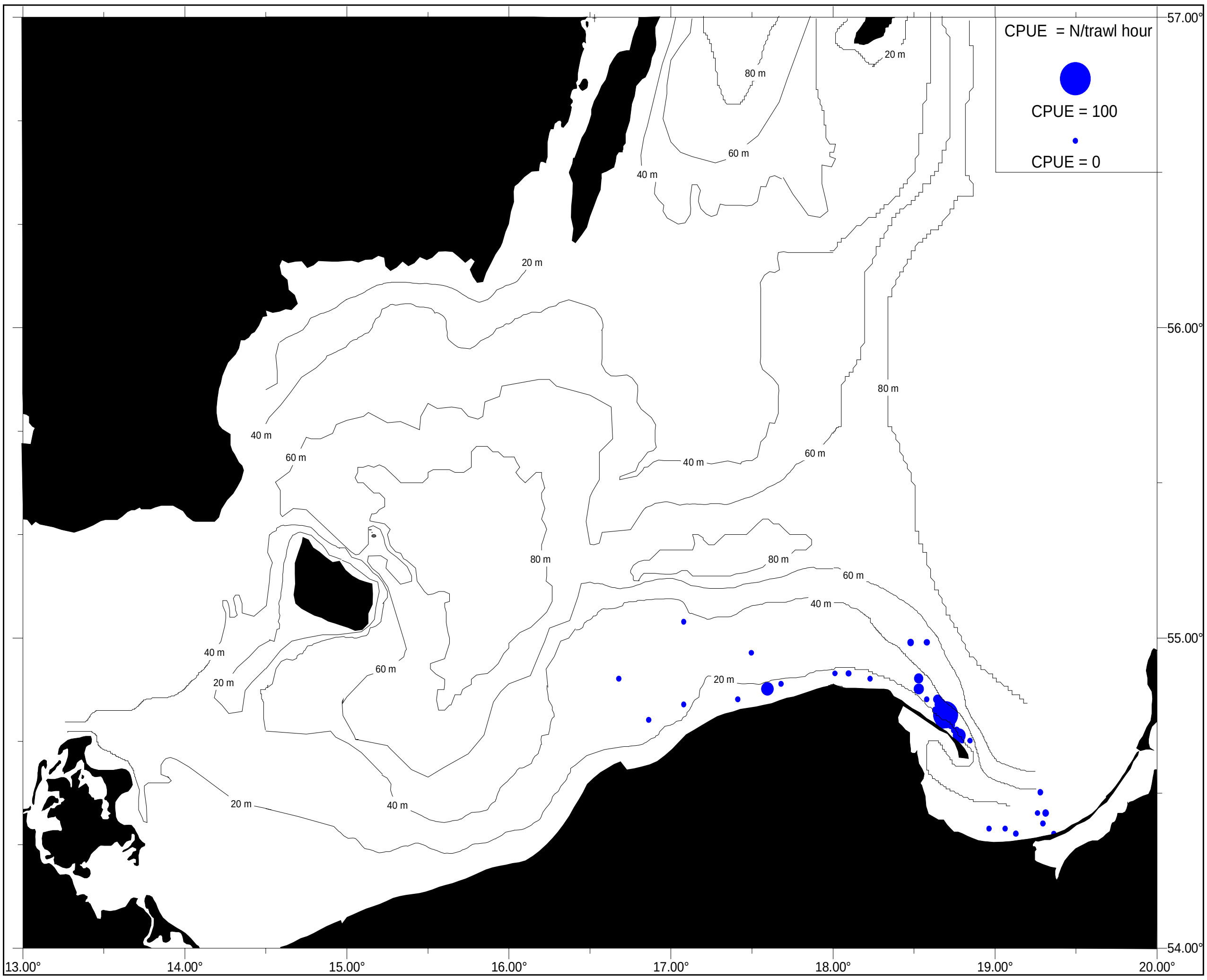


Figure 9.2.4.6 Geographical density distribution of juvenile cod (TTL < 16 cm) and length distribution of all caught cod in the Central Baltic Sea in October 1996 during night and day time: Night and Day time CPUE (number per 1 trawl hour) for Solea Survey 398 1996 (SO1096) with IKMT-trawl of juvenile cod. Length distribution for all cod caught during day and night fishery, respectively, at all IKMT-trawl stations summed up for all Solea surveys performed in the period 1993 to 1996.



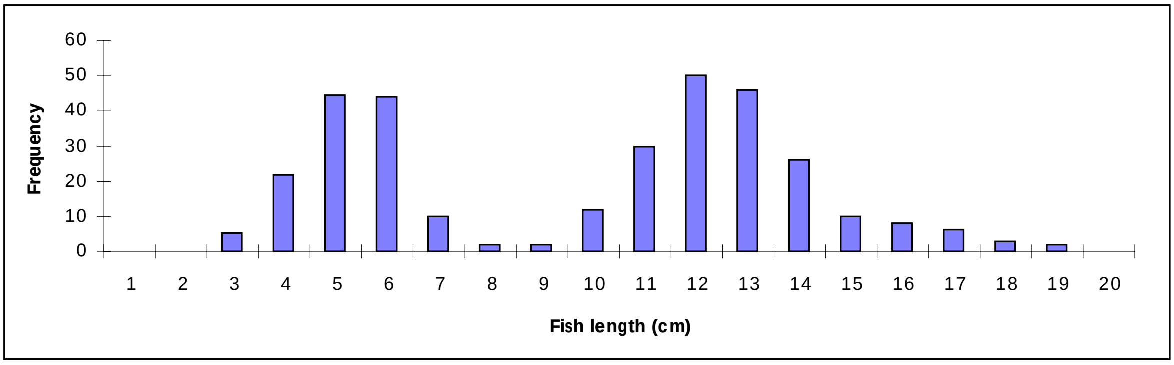


Figure 9.2.4.7 Geographical density distribution of juvenile cod (TTL < 21cm) and length distribution of caught juvenile cod in the Eastern and Central Baltic Sea in November 1996 during daytime: Day time CPUE (number per 1 trawl hour) for BALTICA Survey 6 in 1996 (BA0696) with RMT- and Bottom-trawl of juvenile cod. Normalised and pooled length distribution: Normalised to number caught per 1 trawl hour (CPUE) at each station for all length groups and then pooled for all stations.

10 DEMERSAL TRAWL SURVEY DESIGN STRATEGIES IN THE FUTURE

The Working Group continued the discussion of the various methods available for allocation of trawl hauls. At present the national bottom trawl surveys are carried out using different haul allocations schemes, e.g., as transects, fixed stations and randomly selected stations, the latter being based either on ICES rectangles and/or by depth strata.

A major aim of the ISDBITS EU-Study project is to reach an international agreement on a new common survey design and haul stratification for future international demersal fish surveys in the Baltic Sea. Such standardization include using a new standard trawls and formulating the results into a manual for conducting international demersal fish surveys. This formulation contain the evaluation of the results form the performed trawl inter-calibrations, statistical evaluation of historical BITS survey data as well as evaluation of clear tow information. This evaluation and agreement of a new international survey design and haul stratification for the international BITS surveys include implementation of the new international design and operation details of the trawls (Annex 6). These analyses assure that the inter-calibration results obtained will be implemented in the new joint international BITS survey design on a long term basis which is similar and in line to the IBTS surveys in the North Sea. The suggestions on changes in the survey design is worked out in co-operation with the ICES BIFS Working Group with the purpose of include a new standard survey design in the ICES BITS Manual. That is to agree on an optimum common BITS survey design and haul stratification for the joint international BITS survey using the new standard trawls.

As a consequence of the terms of reference and the purpose of the ISDBITS EU-Study-Project to standardise the BITS survey design with respect to a introducing a standard trawl gear as well as standardisation of survey stratification and sampling allocation a request was put forward from the ISDBITS group to the WGBIFS Working Group (April 2000 meeting) to discuss and decide on principles of the survey design strategies for the BITS survey. Such decision on principles has been necessary to enable the continuation of the ISDBITS working tasks.

Future BITS survey stratification and sampling allocation: Based on the discussions the working group suggest a stratified random survey strategy to be applied to the future BITS survey.

10.1 Survey stratification schemes

Timing of the BITS survey (survey stratification according to season of year):

The new gear was introduced in 1999 for inter-calibration purposes. At present several countries conduct biannual surveys in spring and autumn in accordance with the recommendation of ICES in "Report of the Baltic International Fisheries Survey Working Group (ICES CM 1996/J:1).

The ICES BIFS Working Group in Tallinn in 1999 (ICES CM/H:1) discussed further the appropriate survey timing and recommend that:

- The spring survey shall be executed in the period 15th February to 25th March
- The autumn survey activities are to be carried out in the period 1St November to 30th November.

This survey timing has been implemented in the 1999 BITS survey and approved by BIFS Working Group at the present meeting.

The above survey periods are targeting the demersal Baltic fish species. In November the Baltic herring stocks usually have migrated to the near coastal (shallow water) areas as well as to the archipelagos. These areas are difficult to cover by trawl partly because of the narrow depth ranges and also due to frequent occurrence of non-trawlable bottom conditions in these areas. February to March is also a problematic period in relation to potential coverage of Baltic herring resources as this period is a herring spawning migration period for the herring in the southern Baltic Sea.

Survey area covered, area of occurrence and BITS geographical survey stratification:

The BITS Survey should primarily be designed to target the important demersal fish resources in the Baltic Sea. That is in general cod and flatfish. For the eastern Baltic Sea (ICES SD 25-32) the main demersal fish resources are cod and flounder. For the western Baltic Sea (SD 22-24) the main demersal fish resources are cod, flounder, plaice, turbot and dab.

Historic records show occurrence of a substantial cod fisheries as far north as the Bothnian Sea (Sub-division 30). At present, however, the cod stock north of Sub-divisions 27 and 28 is considered to be insignificant. The coverage of the

Baltic Sea (ICES SD 25–31) of each country are presently operating in the area south of 58° 00' N. It is recommended that the "new" survey should cover the area up till 58° 00'N (northern border of ICES SD 28) in both autumn and spring in order to cover the Baltic cod resources. The option to alter the area surveyed should however be available if the distribution pattern of the cod stocks changes. In historical times in this century the occurrence of cod in more northern areas has been associated with big cod year classes which distribute by drift as larvae to the northern areas. Strong year classes will accordingly be recognised as 1 group in the BITS survey in the spring in the standard survey area, and also higher densities than usual will probably be detected in ICES SD 27-28. If an unusual large year class of cod is found and substantial higher catch rates in the standard survey area are detected a wider distribution area of 1-group cod is to be expected and the area surveyed should preferably be extended to the more northern ICES Subdivisions 29-32 in the following autumn season in order to obtain an full area coverage of the 1-group cod distribution.

It is furthermore suggested that the survey area comprise ICES SD 29 and 32 during the autumn survey in order to cover the northern flounder resources. Substantial changes in flatfish distribution in the northern part of the eastern Baltic Sea has not been detected in recent historical time series.

In relation to survey coverage and potential occurrence of unusual strong cod year classes attention should be made to possible changes in general hydrographical conditions in the Baltic Sea area which could indicate presence of major inflow events of Atlantic water to the Baltic Sea. Such strong inflow events have the potential of producing strong cod year classes with a time lag of 0.5 to 2 years depending on the timing of the inflow..

In conclusion it is suggested that 6 major geographical BITS survey strata are used in stratification of the BITS survey both in the autumn and spring survey:

Western Baltic Sea: ICES SD 22 and 24 (and to the extent possible SD 23)
Eastern Baltic Sea: ICES SD 25, 26, 27, 28
In the autumn survey supplementary geographical coverage should be made:
Eastern Baltic Sea: ICES SD 29 and 32.

Depth strata information available to be used in the BITS survey stratification:

At the Workshop in Rostock, January 1999 (ICES CM 1999/H:7), there was established two data sets giving estimates of the depth layers in the Baltic Sea. The international trawl surveys is expected carried out in the form of a stratified random survey. As stratification criteria the squares of the ICES Sub-divisions or the depth layers are possible. In both cases the areas of the strata are necessary. Since different estimates exist for the different areas it was necessary to recommend which values should be used in the trawl surveys.

The following depth information data were available:

1) Swedish data using planimeter measurements covering the statistical rectangles of the ICES sub-divisions 23- 29, 32. The depth information is aggregated by useable for 10 m depth layers.
2) Danish data using planimeter covering parts of ICES Sub-divisions 21 and 23. These data were compiled for special investigations and do not cover the whole Sub-divisions.
3) Polish data using planimeter measurements covering parts of ICES Sub-divisions 25 and 26. These data are used for special investigations and do not cover the whole Sub-divisions.
4) 4. German data using vessel depth-measurements and map information which are compiled using mathematical models (Seifert *et al.* 1995) This information cover ICES sub-divisions 21 - 29. The smallest resolutions of the data are 1' of longitude and 0.5' of latitude for the Belts and the Arkona Sea and 2' of longitude and 1' of latitude for all other areas. These data were made available by Dr. Hinrichsen, Institut für Meereskunde, Kiel. The depth information was provided by 5 m depth layers and quarters of statistical rectangles.

Since data from Denmark and Poland do not cover whole ICES Sub-divisions only the data from Sweden (S) and Germany (D) were considered appropriate for the present task.

A comparison between the German and Swedish data showed small differences in areas. This is to be anticipated due to the difference in approaches and maps used. The magnitudes of differences are illustrated in Table 1 of the workshop report, which summarize the areas in nm² for ICES sub-divisions 24-28. The comparison is also shown in Figure 1 where the proportions of the depth layers are shown. ICES Sub-divisions 23 and 29 are excluded because the coverage of these areas is different between Sweden and Germany.

Table 2 in the workshop report compare the data for ICES Sub-division 24 on a square by square basis. These estimates are comparable. This appears clearly when the proportions of the different depth layers are compared.

The Rostock workshop was unable to evaluate which of the two data sets give the most reliable estimate of the depth layer information. For several reasons the workshop recommend that the German depth information to be used at this stage. The German approach is well documented and is based on computerized information. This implies that depth information may be manipulated easily, which allow a flexible construction of dept-strata - the depth resolution is 1m and areas may be defined freely by the user. The German depth information may also easily be updated by including new depth data.

However, for ICES Sub-division 32 and for some squares of ICES Sub-division 29 only Swedish data are available. The workshop recommended that the Swedish data are used for these areas.

Appendix 1 of the workshop report provides the areas of the depth layers per ICES squares aggregated on 10 m depth layers. Additional information on a finer aggregation scale (areas per 5 m depth layers per quarters of the ICES squares) were delivered to the workshop participants in the form of an EXCEL file. The Danish Institute and the Institute of Baltic Research Warnemünde are available for inquiries relating to the depth information.

The international trawl surveys are to be carried out in the form of a stratified random survey. As stratification criteria the squares of the ICES Subdivisions or the depth layers are possible. In both cases it is necessary to know the area of the strata. Since different estimates exist for the different areas a comparison of areas of the different depth strata within all relevant ICES rectangles were carried out in Rostock, 11-14 January 1999 (Workshop on Baltic Trawl Experiments, ICES CM 1999/H:7). The BIFS Working Group in Tallinn, August 1999, (ICES CM 1999/H:1) agreed that these data should be used for the international bottom trawl surveys.

BITS depth stratification

The following depth stratification of the BITS Survey was suggested to be used for a start.

Depth strata:

1: 10-20 m
2: 21-40 m
3: 41-60 m
4: 61-80 m
5: 81-100 m
6: 101-120 m
7: > 121 m

Overall survey stratification

In conclusion a survey stratification of 6 geographical strata (ICES Subdivisions) and 7 depth strata (20 m depth strata) in both the autumn and spring surveys. This is in the autumn survey supplemented with 2 geographical strata (ICES SDs 29 and 32). Thus, the haul allocation should be made based on coverage of all ICES Subdivisions and depth strata within these subdivisions and accordingly distributed proportional to mean CPUE-values in recent years (see below).

10.2 Haul Allocation

The precision of survey abundance estimates primarily depends on the effort applied and may be expected to decline proportional to the square root of the number of hauls. Cost on the other hands is linearly dependent on the effort level implying a diminishing return of the marginal effort. Choosing the number of hauls therefore requires rough evaluation of cost and benefits. The benefits associated with the standardisation of the gears and a joint station allocation implies that a lower number of stations are usually required to reach a precision similar to the present.

The working groups have not attempted to specify criteria's for any optional overall effort level applied in the BITS surveys. This would include assessment of the number of hauls per survey needed for stock assessment purposes in relation to survey costs. However, the working group suggests that the total number of hauls by season and year should be fixed but the allocation of the hauls should be flexible. The hauls should be allocated according to the stratification of the ICES Subdivisions using depth layers.

The haul allocation by ICES Subdivision and depth stratum should be made based on an optimal average allocation based on estimated average distribution patterns by ICES Subdivision and depth from historical BITS CPUE-data of cod and flounder in ICES SD 22-28 in recent times. The number of trawl stations should be chosen dependent on the mean variabilities of the mean CPUE. Thus, the haul allocation should be made based on coverage of all ICES Subdivisions and depth strata within these subdivisions and distributed proportional to mean CPUE-values in recent years.

The quality of the CPUE-estimates of those years which are most far from this optimal average haul allocation should accordingly be evaluated in order to predict the quality of the CPUE-indices in years with very unusual distribution patterns of the target species and age groups. This can be done by evaluating the variance and the standard deviation of the CPUE-inices in these years.

If the analyses of the historical BITS data including hydrographical parameters show that it is possible to take into account the dependence of catch rates on hydrographical factors, it should be attempted to formulate that dependence into an algorithm. If such an algorithm can be obtained it will be possible also to make haul allocation according to this algorithm.

When the basic, optimal allocation of hauls has been made it should following be attempted to allocate the hauls evenly by subdivision and depth.

Haul allocation based on selection from a library of possible haul-tracks

Stations should be fixed on a statistical basis prior to the commencement of each survey for each season. The selection of trawl hauls and the distribution of hauls between participating countries will require international co-operation. These stations should be randomly selected from a library of possible haul-tracks. This demands that data on fishing positions from the library of clear tow information is available for the survey design. A clear tow information library is now available from the ISDBITS project covering more than 1500-2000 tracks in the Baltic Sea. This clear tow information has been compiled in relation to haul stratification based on available positioning measurements (including information from research vessels) and tracking of commercial fishing vessel trips in the Baltic Sea in order to obtain optimum haul stratification and to enhance survey planning and operation. Furthermore, the ISDBITS project is in the process of compiling a “users manual” for clear tow information.

If the number of possible stations in a strata is too low for a random selection fixed stations can be used every year.

11 RECOMMENDATIONS

11.1 Specific recommendations for future work

The following gives specific recommendations for future work of WGBIFS:

1) The WGBIFS recommends that the main results and the cruise reports from acoustic surveys in 2000 as well as cruise descriptions from all participating vessels should be delivered to the co-ordinator of the BALTDAT project (Dr. F. Arrhenius, Lysekil, Sweden) in the proposed exchange format (BAD1, BAD2 to be delivered to Hirsthals) at least two months before the meeting for preparing a summary of the survey results. The summary is needed for WGBFAS.
2) The corrected and updated database BAD1 for years 1991 to 2000 should be sent to E. Götze, Hamburg, Germany, about two months in advance to WGBIFS meeting in year 2001.
3) The WGBIFS recommends that scientists are urged to participate on foreign vessels with the aim of harmonising and standardising sampling procedures and facilitating implementation among the participating countries.
4) The WGBIFS recommends that an evaluation must be made on how to average several hauls in a rectangle.
5) The WGBIFS recommends that a relevant way to publish the data from the hydroacoustic surveys should be considered and evaluated to keep record of survey results.
6) The WGBIFS recommends that the variability in the results of the acoustic surveys used for the assessment should be analysed. For this work the BAD1 must be continued and updated.
7) The WGBIFS recommend that as many as possible complete datasets of acoustic values and biological data should be used as a test for the exchange of data from the individual national acoustic surveys to the forthcoming database.

8) The WGBIFS recommends that statistical analyses of historical demersal trawl survey data in order to be able to evaluate the survey design with respect to area and depth coverage and hydrography should be presented in year 2000 in connection to ISDBITS-project. Preliminary analyses should be presented at the ISDBITS EU-Study Project meeting in Wladyslawowo, Poland in June 2000.

9) The WGBIFS recommends that for BITS-database a new format agreed and presented in the BITS manual should be used already for all surveys in year 2000 and that the old data should be updated accordingly by national laboratories.

10) The WGBIFS recommends that the new sampling methods, i.e. the new standard gears, should be used as standard gears during the BITS survey in first quarter in 2001. The descriptions of the new standard gears are given in the report of the WGBIFS manual.

11) Conversion factors between new and old trawls on national level should be make available to link new and old time series of the Baltic international trawl survey. Methods to estimate the conversion factors should be further discussed and improved. The first version of the conversion factors must be available until at the end of year 2000.

12) Since the analyses of the available data are not finished and additional experiments are planned during the November survey 2000 the accuracy of the conversion factors can not be judged yet. Therefore, the working group recommends that it is necessary to plan and to carry out additional inter-calibration experiments after 2000.

13) The development of new survey design is necessary for the international co-ordinated demersal trawl survey. Based on further analyses of the available BITS data in combination with the hydrographical data from the ICES data base the stratification scheme for the ICES sub-divisions and the allocation of the hauls should be developed until the end of 2000. One basic condition for this design is the availability of a library of track lines with clear tow information. These data must be available in a system, which allows to select random subsamples for solving different problems.

14) Since the density of the available stations in SD 28 was relative low in the previous years the Working Group recommends that during the surveys in first quarter in 2001 the countries should shift some survey time to this SD. The co-ordination of this special task in March 2001 should be carried out during the next meeting of the ISDBITS project.

15) The discussions concerning the stratification scheme for the Baltic demersal trawl surveys showed that hydrographical parameters influence the density distribution pattern of species (CPUE - values). The analyses have shown that in Sub-divisions 26 and 28 only few information exist. Since such data are important for the planing of the survey activities the Working Group recommends that during the November survey 2000 and the March survey 2001 hydrographcal data, should be sampled after each haul and should be made available for further analyses. For these analyses it is important that the hydrographical data are sampled on the same position and at the same time as the haul was carried out.

11.2 Next meeting in year 2001

11.2.1 Time and venue

The Working Group discussed its next meeting (to be decided at the Annual Science Conference in Brugge, Belgium). WGBIFS recommends that it will meet four days in late February 2001 (Chairperson: E. Aro, Finland), venue to be decided, in order to assist WGBFAS and ACFM.

11.2.2 Terms of reference

According to Annual Science Conference Resolution in Brugge, Belgium (C.Res.2000/x:xx) The Baltic International Fish Survey Working Group [WGBIFS] (Chair: E. Aro, Finland) will meet in (to be decided in ASC, Brugge, Belgium, in early April 2001 to:

a) combine and analyse the results of the 2000 acoustic surveys and report to WGBFAS;

b) correct errors in and update the hydroacoustic database BAD1 for the years 1991 to 2000 (E. Götze);

c) plan and decide on acoustic surveys and experiments to be conducted in 2001 and 2002.

d) update, if necessary both Baltic International Trawl Survey (BITS) and Baltic International Acoustic Survey (BIAS) manuals;

e) continue the comparison and analysis of results from concurrent survey activities by the traditional and the new standard trawls;

f) consider and analyse conversion factors between new and old trawls, on national level and develop methods to estimate the proper conversion factors.

g) To continue the evaluation of the survey design strategies for future BITS surveys.

h) continue to establish acoustic database BAD2;

The above Terms of Reference are set up to provide ACFM with information required to respond to requests for advice/information from the International Baltic Sea Fishery Commission and Science Committees.

WGBIFS will report to the Baltic Committee and Resource Management Committees at the 2000 Annual Science Conference in Belgium.

Some of the above Terms of Reference are set up to provide ACFM with information required to respond to requests for advice/information from the International Baltic Sea Fishery Commission and Science Committees.

WGBIFS will report to WGBFAS, and to the Baltic and Resource Management Committees at the 2000 Annual Science Conference.

Justifications

The main objective of the WGBIFS is to co-ordinate and standardise national research surveys in the Baltic for the benefit of accurate resource assessment of Baltic fish stocks. From 1996 to 2000 attention focused on evaluations of traditional surveys, introduction of survey manuals and considerations of sampling design and standard gears as well as co-ordinated data exchange format. Future activities will be devoted to development of new standard gears for demersal surveys, biological sampling regimes and analysis of both demersal and acoustic trawl survey results. During 1999-2000 many national surveys has adopted the new standard demersal gear (TV3-trawl) for surveys in the Baltic. However, statistical analysis are required to calibrate research vessels operations in order to obtain relevant assessment data in time for the WGBAFS.

The most important future activities are such as to combining and analysing acoustic survey data for Baltic Fisheries Assessment Working Group, develop further the hydroacoustic database, plan and decide on acoustic surveys and experiments to be conducted. The quality assurance will require achievements towards a fully agreed calibration of processes and internationally agreed standards.

12 REFERENCES AND WORKING DOCUMENTS

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Oeberst, R. 2000. Proposal for the stratification of the Baltic Sea for the Baltic International Trawl Survey. BIFS Working Group-ISDBITS-Project, Copenhagen, 3–7 April 2000.

Anon. 2000. IODE Group of Experts on Technical Aspects of Data Exchange. Eighth Session, 13–17 March 2000.

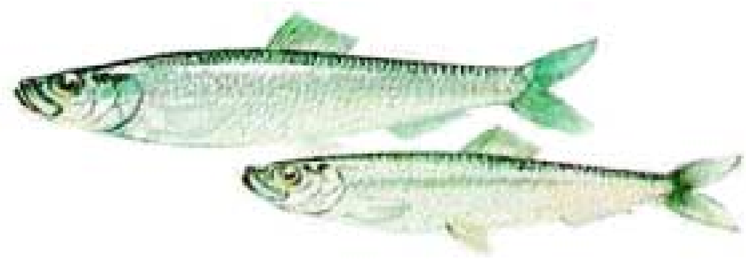
ANNEX 1 – REPORT FROM THE THIRD BALTDAT (EU STUDY PROJECT 98/085) MEETING

Rapporteur: Fredrik Arrhenius, Institute of Marine Research, Lysekil

Where: Institute of Marine Research, National Board of Fisheries, Lysekil, Sweden 18-20 January 2000

Participants:

Dr F. Arrhenius	(Co-ordinator)	Sweden
Mr. T. Bleechmore	Denmark	
Mr. P. Buch	Denmark	
Mr. M. Casini	Italy/Sweden	
Dr. Z. Cielniaszek	Poland	
Mr. P. Faber	Denmark	
Mr E. Götze	Germany	
Mr. N. Håkansson	Sweden	
Mr. O. Kaljuste	Estonia	
Dr W. Pelczarski	Poland	
Dr. H. Peltonen	Finland	
Dr. V. Severin	Russia	
Dr F. Shvetsov	Latvia	
Mr K.-J. Staehr	Denmark	



(the picture was taken from the homepage of Danish Institute for Fisheries Research)

Major tasks:

a) *Evaluate the status of the creation of an international database for acoustic and biological sampling data. Evaluation of the progress of compiling the historical acoustic data to be incorporated into the implemented database*
b) *Plan and discuss experiments on TS measurements in year 2001*
c) *Discuss topics for the ICES FAST WG in IJmuidem/Haarlem in April 2000*
d) *Look at the status of some duties from last years BIFS meeting*
e) *Discuss the survey plan for year 2000*
f) *Discuss the new two strategy documents from the EU*

Task a)

- Summery of the work by each country:

Sweden

Sweden had prepared the biological data from 1986 to 1999. The acoustic sampling data have not yet been prepared in the suggested format. However, the data between 1986 to 1992 are available at the institute. The more recent ones are in a database onboard *Argos*. The final work is to finish up the programming to extract the data. The goal was to finalise the programming and produce one dataset to be tested and validated during the meeting.
The report from last survey was distributed to all participants.
Germany

Eberhard Götze presented a nice table with the status of the biological and acoustic data processed from different years. They have delivered acoustic data from 1997-1998 to Karl-Johan Staehr in Hirtshals. Some of the biological data have been done.

Poland

Poland had delivered a complete dataset of acoustic and biological sampling data from 1998 for evaluation in Hirtshals. This dataset will be tested during this meeting. Poland will prepare data from 1994 and onwards.

Russia/Latvia

Russia and Latvia have prepared a complete dataset of acoustic and biological data from one year (1998) in an Excel format. This data set will be evaluated during the meeting.

Finland/Estonia

These two countries will deliver their first dataset when they have finalised their 1999 years of data.

Denmark

No data to prepare from the Baltic proper.

- Presentation of the Internet database:

Peter Faber and Tasman Bleechmore made a presentation and status of the Hersur/Baltdat internet database. They also made guaranties that the database system for logging data will be up and running by 1 March 2000. So far no access to the database. The preliminary home page is http://www.dfu.min.dk/hersur.

Peter Buch presented the XML formats. More information can be found on the internet (http//www.w3.org).

- HERSUR/BALTDAT exchange format

The last version of the HERSUR/BALTDAT exchange format (Rev. IV) have been delivered just in time before the meeting.

Some special topics and corrections were discussed during the meeting.

\- General Cruise info (CI)
It seems that this part is under control.

\- Acoustic data (SA)
Mean depth
This is a problem in the Baltic. It must be hand calculated. No other solution was suggested.

\- Biological data (HH)
Position 44-45 and 48-49.
The ranges must be change to include areas in the eastern part of the Baltic. This also applies to table HE.

Position 53-55.
Should be mean bottom depth

During the meeting we have a discussion concerning the shooting position and decimals. Should it be rounded or be a 0. The suggestion was that we should truncate decimals in record type 1 (HH) and add it in record type 1a (HE)

\- Record type 2 (HL).
Position 56-58.
No of measured in subsample and/or sample.

- Record type 4 (CA).
Station No should be changed to mandatory
We also discussed the problems with composite hauls. The conclusion was to avoid composite hauls.

All of these points will be included in the next version of the manual.

We did also have a more general discussion how to deal with certain general matters. This was something that people had different opinions and therefore I left out that on purpose. If these items are important to put on paper, we should continue this discussion again during the next WGBIFS meeting in Copenhagen.

The rest of the first day and night was dedicated to evaluate the different datasets from each country. This was done by the programming team from Denmark (Peter Faber, Peter Buch and Tasman Bleechmore).

Some corrections was necessary on all datasets. Peter Buch made a programme for Latvia/Russia to take out and deliver the data in the right format. These guys gave Ok sign for all the dataset that were delivered by the different countries. Therefore, participating fishery institutes will be requested to further compile and prepare data in agreed exchange format for as many years as possible to be delivered to database system for logging data in Hirtshals.

Task b)

Fredrik Arrhenius made a general presentation about the problem behind the task.

To estimate fish abundance in acoustic surveys, target strength (TS) must be known as a function of fish length (*L*). The form of this function is commonly assumed to be:

$$TS = 20 \text{ Log } (L) - b$$

where *b* is a constant. The value of *b* may be determined by comparing an observed TS histogram with the size distribution of the ensonified fish, obtained by trawling or other means. The TS to fish length relation at frequency 38 kHz currently applied is the one recommended by ICES for Baltic clupeids:

$$TS = 20 \log (L) - 71.2$$

The actual TS constants applied since 1983 for Baltic Sea acoustic surveys are in reality the North Sea herring properties. Herring is physostome, with an open swimbladder. Many physiological and behavioural factors are believed to influence the observed TS of herring. In general, all these factors will affect the size or aspects of the swimbladder, and hence the TS.

Following factors were discussed:

Physical factors:

- Fat content.
Primarily rule of swimbladder is buoyancy higher fat smaller swimbladder
About 0.2 dB per 1% increase in fat content
Schooling species shows seasonal changes in fat content.

- Maturity and feeding state

Gonads develops, tend to compress swimbladder and thus reduce the TS.
A full stomach may also have the same effect
About 2-5 dB differences in Atlanto-Scandian herring.

- Water depth

As herring has no gas secretion gland. It is unable to inflate the swimbladder while below the surface
Swimbladder volume and hence TS decreases with depth

- some diffusion with time?
- Less buoyancy leads to change in swimming behaviour with body tilted more upward, reducing the aspect of the swimbladder in the acoustic beam

Fish behaviour

- Tilt angle
Differences between day and night
Pelagic schools shows avoidance reaction
Tilt on the TS can not be separated acoustically

Additional measurements

- Water salinity
- Temperature
- Light level

Each topic was discussed. One general view was that we should start to look at the TS distribution. This is stored but not easy to take out from the system. Therefore, we suggested to start with the following two points:.

1. We will discuss with Simrad if they have any tool to extrapolate the TS distribution from the data
2. During 2000 TS should be stored during data logging

Task c)

I have talked with the Chair of ICES WGFAST. He want us to come up with something for their ToR about TS measurements of Baltic herring and sprat.

As you may understand, he wants to have an efficient workshop, and also to fulfil the ToRs. If no one from the Baltic is able to come, this will evidently not be done. In this last case, he think that at least the FAST should have to know about herring TS problems in the Baltic and discuss on this point in a general way, in order to provide ICES with some thoughts and recommendation.

His suggestion is that even though no one come, the scientists interested in this field should send some document or short note or any kind of workable result in order to give the FAST members material to discuss and work on.

Fredrik Arrhenius will attend to that meeting in Haarlem to present something from the group.

Task d)

The BIAS Manual were discussed during the meeting and the following summarises those discussions: **Note that some of you have some work to be done before the next WGBIFS meeting in April 2000** (see last years WGBIFS report).

Gear

A schematic draft of the relevant specification to be filled in for the above information have been delivered by **Eberhard Götze**, Hamburg, Germany, during the autumn.

Maturity

Maturity should be included. However, we were not sure about the system. We will further discuss this at the next WGBIFS meeting.

Task e)

In 2000 the following acoustic surveys are planned during the time period September/November:

Vessel	**Country**	**Area**
ARGOS	SWEDEN	27(PARTS 24,25,26,28,29S
ATLANTIDA	Russia, Latvia	26,28
BALTICA	Poland	25,26 within Polish EEZ (parts 24)
SOLEA	Germany, Denmark	22,23,24 (parts21)
JULANTA	Estonia, Finland	29N, 30, 31, 32

Task f)

Fredrik Arrhenius made a short presentation of the two new draft document that have been delivered by the Commission.
The title of these two documents was the following:

1. On a financial contribution from the Community towards the expenditure incurred by the Member States in collecting data, and for financing studies and pilot projects for carrying out the common fisheries policy.
2. Establishing a Community framework for the collection and management of the fisheries data needed to conduct the common fisheries policy

The former system with study projects will be taken away and be replaced by a new system. Appropriate financial assistance is required for the proposal for a Council Regulation establishing a Community framework for the collection of data needed to carry out the CFP. The proposed arrangements provide for a Community financial contribution towards the expenditure incurred by the Member States under national programmes for collecting essential data where this expenditure is eligible under the relevant Community programmes. The scheduled six-year duration should establish the requisite level of stability.

In addition to the financial contribution towards the expenditure incurred by the Member States in collecting and managing the data, methodological back-up is needed. This includes assessment of the quality of the data collected, standardisation of methods and co-ordination between Member States. Steps also have to be taken to explore the possibilities and usefulness of extending the scope of the collection of basic data to include environmental issues, aquaculture and activities connected with fisheries and aquaculture.

The Community assistance shall cover eligible expenditure incurred by the Member States between 1 January 2000 and 31 December 2005. Only the expenditure referred to in Annex shall be regarded as eligible. The contribution from the Community shall not exceed:

- 50% cost of the eligible public expenditure incurred in carrying out a minimum programme.
- 35% of the eligible public additional expenditure incurred in carrying out an extended.

The commission require documentation for a two level data collection strategy for fisheries data for the period 2000 to 2005 to be used in this program. Some of us (Fredrik Arrhenius) have got the task to come up with such a documentation. The draft should be prepared by the end of February 2000 for the production of a proposed skeleton implementation regulation. The draft regulation would be considered by STECF and be ratified in the 2nd quarter 2000. The two level strategy should developed from the current sampling programme. The first level to be guided largely by the current biological sampling program and requirements of ICES, NAFO, NEAFC, ICCAT, etc. extended to cover a small number of additional species, and an enhanced economic and fishing effort program in line where applicable with the OECD data. The second level should extend the level one programme to include beneficial additions.

More information will be presented at the next BALTDAT meeting in connection with ICES WG BIFS meeting in Copenhagen April 2000.

Recommendation:

1) Everyone should now be able to prepare both acoustic and biological data for the data exchange format. Each of you have had their exchange format tested by the programmers from Denmark. Therefore, each participant (incl. Associated contractors) should produce their outputs to the internet database.

The next meeting will be during the ICES WG BIFS meeting in Copenhagen 3-7 April 2000. We will devote one day for the BALTDAT study Group.

I hope to see you all in Copenhagen in April

Lysekil 8 February 2000

Fredrik Arrhenius,
Co-ordinator BALTDAT (EU Study project 98/085)

ANNEX 2

MANUAL FOR THE BALTIC INTERNATIONAL DEMERSAL TRAWL SURVEYS

Updated and agreed during the meeting of the Baltic International Fish Survey Working Group
Copenhagen, Denmark
03-07/04-2000

Version 3.0

TABLE OF CONTENTS

1 INTRODUCTION

At the ICES Annual Science Conference in September 1995, the Baltic Fish Committee decided, that a manual to be used at trawl surveys in the Baltic area should be elaborated (C. Res. 1995/2:41). This manual should in its context follow the format of the manual used for the International Bottom Trawl Surveys (BITS). The new, updated manual was edited based on the previous version of the "Manual for the Baltic International Trawl Surveys" (Addendum to ICES CM 1996/J:1).Based on the experiences of the ongoing national surveys the manual (Appendix to ICES CM 1998/H:4) was discussed, improved and updated.

The objective of the BITS program is to standardise fishing gear and methods throughout all national surveys where data are used as indices for assessment purposes. However, it is anticipated that the required change from national gears to a common standard gear in some instances cannot be achieved immediately.

The participants are recommended to conduct their national surveys according to this manual. The present manual applies to all bottom trawl surveys that are conducted within the framework of the BITS. The standard sampling procedures are uniform for all surveys.

Experiences from the practical realisation and application of the surveys will be the background to evaluate the content of an uniform „ Manual for the Baltic International Trawl Survey “. Based on this the manual is currently updated once a year. A crucial task is to implement all protocols into a comprehensive Quality Assured Handbook which should be mandatory for all participating national research vessels. It is expected that this work will result in further amendments to the present manual.

2 THE FISHING METHOD

2.1 Standard fishing gear

For the International Baltic demersal trawl surveys standard trawls shall be used. The design and construction are given in the report of the Workshop on Standard Trawls for Baltic International Fish Surveys, Gdynia, 1997. (ICES CM 1997/J:6). A complete specification will be available in early 2000, as a product of the ongoing ISDBITS project. Until then the specification and the corrections made as a result of the flume tank testings and initial full scale testings can be obtained by contacting DIFTA, The North Sea Centre, Hirtshals, Denmark.

The type of trawl is called TV3 and come in two sizes for different sizes of research vessels, one 520 meshes in circumference and one 930 meshes.

The small trawl should be used for vessels up to around 800 HP and the larger trawl for vessels with higher towing power.

Quality control
During construction of new standard trawls the detailed specification shall be followed in detail concerning, materials used, construction and dimensions.

During use the trawls shall be checked at regular intervals by taking a number of check measurements on the geometry of the nets. (The intervals and a list of check measurements will be given in the above mentioned detailed trawl specification.)

2.2 Fishing positions

The international trawl surveys should be carried out in form of a stratified random survey. As stratification criteria the squares of the ICES Sub-divisions or/and the depth layers are possible. In both the cases the areas of the strata are necessary. Analyses of the different data sets available were carried out in the Workshop on Baltic Trawl experiments (ICES CM 1997/H:7). In this report the areas of the depth layers per ICES squares aggregated on 10 m depth layers are presented. These data should be used for the international bottom trawl surveys. The tables are given in appendix XI.

Since the analyses concerning possible influences of the water depth and hydrographic parameters in relation to the fish density distribution are not finished, an exact survey plan can not be designed now.

The proposed number of about 350 trawl stations for the whole Baltic Sea must be updated later dependent on the statistical analysis of the previous surveys.

Each year the necessary stations should be randomly selected before the beginning of the international trawl surveys from a list of clear haul data. These stations are a selected sub-sample of the data base of possible trawl tracks. If the number of possible tracks is not large enough for a random selection in some strata fixed stations can be used every year.

2.3 Standard fishing operation

The standard haul shall be performed using a standard towing speed of 3 knots. The speed should be measured as the speed over the ground.

The standard haul shall last for 30 minutes. Start time is defined as the moment when the vertical net opening is stable at the stated towing speed. Stop is defined as the starts of hauling back the trawl.

Trawling shall only take place during daylight, defined in the checking program as the time between 15 minutes before sunrise until 15 minutes past sunset.

Fishing must not be directed towards fish densities or shoals located by means of fish finding equipment like echo sounder and sonar.

Quality control
The horizontal distance between the upper wing-ends should be monitored if possible during the whole tow. The following table gives the limits of the wing-end distance and the corresponding height of the trawl at the centre of the headline.

Trawl measurements at 3 knots in metres	**Distance between upper Wingends**	**Approximate corresponding height at centre of headline**
TV3, 520 meshes	13.5 – 14.5	2.2 – 2.5
TV3, 930 meshes	26 – 27	5.5 – 6.5

Note: this table may be subject to changes following check measurements in the Flume Tank in the autumn of 1999.

3 SAMPLING OF TRAWL CATCHES

The following guidelines are to be used for each haul during the survey.

All forms should be filled in using a pencil in order to allow correcting and stay waterproof.

The working up of the catch can be seen as a number of processes succeeding each other.

3.1 Estimating the total weight of the catch

Purpose.
To achieve an estimate of the total weight of the fish and "other" caught in the given haul.

Preconditions:
The fishing method and the gear performance are in accordance with the specifications given in section 2 in this manual.

The total catch weight must be estimated by one of the following methods.

1. Weighting the total catch by use of a balance.

2. Counting the number of standard filled baskets. The estimated average weight of the baskets is estimated by weighting five random selected baskets.
3. By adding up the total estimated weight or weighted weight of each species (will often be achieved during estimation of the species composition).

The results are recorded in kilograms.

3.2 Estimating the species composition of the catch

Purpose.
Species composition of catches should express the total weight and number of specimens of given species in catch.

Preconditions:
The fishing method and the gear performance are in accordance with the specifications given in section 2 in this manual.

Guidelines.
All catch is sorted by species, storing different species separately in boxes or baskets for further analyses. In order to simplify further working up of the catch, only boxes or baskets of same size and material should be used.

Certain species that are hard to distinguish from each another may be grouped by genus or higher taxonomic units.

In cases of exceptionally big catch (e.g. over 500 kg) or other circumstances, not allowing the sorting of all catch, the species composition should be estimated using sub-sampling.

The procedure for sub-sampling is one of the following depending on the circumstances:

1. If all species appear fairly frequently in the catch, simultaneous sub-sampling of all species in the whole catch should be used:

   A. Three sub-samples each weighting app. 100 kg's, depending of the impression of the species included in the catch, are sorted by species. The samples must be taken from the first, middle and last sections of the trawl cod-end. Be aware of, that the three sub-samples together should represent the whole catch.

   B. Each species from the three sub-samples are pooled and each species are weighted separately. The weights are recorded.

   C. The total weight of all species (c) in the three sub-samples is estimated by adding the weight of the three samples.

   D. The total catch weight of each species is estimated by raising the sub-sample weight for a given species with the ratio between the total catch weight and the summed weight of all sub-samples.

   E. All total and sub-sample weights are recorded.

2 If some species appears in very low numbers in the catch, while other species appears in high numbers, sub-sampling of only the frequent species in the catch may be applied.

   A. The species appearing with low frequency are sorted out of the whole catch by species and weighted.

   B. The rest of the catch is treated as specified in method 1.

   C. All total and sub-sample weights are recorded on the Species-form.

Non-fish species should be recorded as well. This group might be grouped and recorded as invertebrates, botanicals or just "Other". Non-organic material (stones, barrels etc.) should be recorded as "Other".

The sorted and weighed fish are then used for the following **length, age and maturity sampling**.

3.3 Length composition

Purpose: Length composition should express the number of specimens of given species per length croup in catch.

Preconditions: The whole catch or a representative sub-sample of the catch is sorted by species.

Guidelines.
Length distributions (length compositions) should be recorded for all fish species caught.

If the number of a given species does not significantly exceed the number recommended below all individuals are measured.

If the number of individuals of a given species significant exceed the number recommended below the following procedure must be adapted:

1) ***All individuals of a given species in the catch of the given species are subdivided into a number of sub-samples. Each sub-sample approximately of the size recommended below.***
2) ***One of the sub-samples is randomly selected for length measurements.***

Always measure the whole sub-sample. Never stop in the middle because you have realised that your sub-sample is too large. In most cases a biased length distribution will be the result.

If you realise that your sub-sample is to small then randomly select another of the sub-samples and continue obtaining the length frequency measuring all of it. If you must, divide this sub-sample into a number of sub-sub-samples and continue the measuring procedure by measuring one or more randomly selected sub-sub-samples).

Length of the fish is defined as total length (measured from the tip of the nose to the tip of caudal fin).

Length is measured to 0.5 cm below for herring and sprat (e.g. lengths in the range of 10.0–10.4 cm are equal to 10.0 cm and lengths 10.5–10.9 cm are equal to 10.5 cm).

For all other species the length is measured to 1 cm below (e.g. lengths in the range of 20.0–20.9 cm are equal to 20.0 cm).

If a certain species is caught in two clearly distinct size categories, both of these size categories should be sampled separately. The number of fish from each sample should follow the sample sizes given below.

Number of length-classes	Number of length measurements
1 - 10	100
11 - 20	200
more then 20	300

Minimum number of individuals to be length measured (in sample or sub-sample).
The number of individuals is dependent on the number of length-classes included in the length range (see Figure 1).

During the length measurements, the above specified number of fish of each species per length group are collected and stored separately by the length-groups for **age, sex, individual mean weight and maturity** estimations.

3.4 Age, sex, individual weight and maturity sampling procedure

Purpose.

The purpose is to estimate distributions of age, sex, weight and maturity for each length class

The complete number of age determinations is used to establish age-length-key (ALK) per Sub-division and quarter. ALKs is used for converting the length distribution on a given aggregation level into an age distribution. The determination of sex and maturity stage is done in order to produce maturity ogives for estimating the Spawning Stock biomass (SSB). The individual weight is used for calculating the mean weight per length class, which is used for converting catch in weight into catch in numbers and the weight at age for calculating the SSB and total biomass. Apart from the mentioned purposes, there might be additional purposes (identifying stock components etc.).

Guidelines.
The samples are collected on the basis of country, quarter and ICES Sub-division for all species.

It is recommended that each country collect otoliths by each haul, so the otoliths are distributed all over the Sub-division.

The following species are sampled for age, sex, weight and maturity estimation:

- Herring
- Sprat
- Cod
- Flounder

The procedure of re-measuring the fish, weighting, estimating of sex, maturity stage and the cutting of otoliths might be made most efficient in one work-procedure for each individual in the above-mentioned sequence.

Consequently the number of fish selected for estimating of sex, maturity stage and cutting of otoliths are equal.

<u>Estimating individual/mean weigh.</u>
After length measuring the fish, if possible the individual weight of each fish is estimated and recorded. If it is impossible to achieve the individual weight, the number and total weight is recorded in order to calculate the mean weight of the individuals in the group. The weights are estimated by use of an electronic balance. The weight is measured in grams. A minimum of five specimens must be weighted even though less are used for cutting of otoliths.

<u>Estimation of sex and maturity stage.</u>
The abdomen of each individual is cut open and the gonads are examined in order to estimate the sex. If the individual is mature the sexes can easily be distinguished, but for immature individuals the task is difficult and special literature about the subject have to consulted.

In the same process the maturity stage is determined according to the classification description of the different stages given in appendix I or according to the code practised on the national level. If a national code is used the national coding must be converted into the BITS 5 stage code according to appendix II before the data are submitted to ICES.

<u>Cutting of otoliths.</u>
The technique for cutting otoliths depends on the species. For descriptions of these techniques, please consult the literature about the subject.

The optimum number of otoliths per length class and ICES Subdivision can not be given in a universal form. A description of the optimum sample size of age readings and length measurements dependent on a universal cost function is given in Oeberst (1999).

The analyses showed that the necessary number age readings in an length class is dependent on

- the portion of the length class within the length frequency and
- the maximum variance of the portions of the age groups within the length class.

The table below gives the minimum number of otoliths from each length group, which must be cut per country, survey, Sub-division and species based on the length distribution.

Length classs	minimum number of age readings
with probably only one age group (age group 0, 1)	2 to 5
with probably more than on age group	
Portion of the length class less than 5%	10
Portion of the length class more than 5%	20

Since the collection of the otoliths should be distibuted over the whole survey time in the ICES Subdivision the actual length frequency of the survey can be used to choose the number of otoliths per length class.

The otoliths may be:

1) read during the survey, if proper facilities and experienced age readers are available on board. Store the otoliths in ice-boxes, envelopes or other suitable containers.
2) stored for later age determining.

In both cases the containers must be labelled with indication of: species, cruse number, date, sub-division, length class.

4 ENVIRONMENTAL DATA

At each haul, the following hydrographical data should be collected:

– surface temperature,
– bottom temperature,
– surface salinity,
– bottom salinity,
– bottom oxygen.

The sampling procedure of the hydrographical data should be according to the standard specified by ICES.

5 EXCHANGE SPECIFICATIONS FOR BITS DATA

5.1 Deadlines of reporting

It is the responsibility of the participating countries to bring preliminary data (age distribution by haul) in exchange format from the 1st quarter survey to the meetings of the Herring Assessment Working Group for the Area South of 62° N and the Baltic Fisheries Assessment Working Group meeting. At present both working groups meetings takes place in April.

Final data should be sent to ICES on 1 June at the latest, so that a report can be prepared for the Annual Science Conference.

The following deadlines were decided for sending data in exchange format to the ICES Secretariat:

Data	Deadlines
Preliminary data 1q (age distribution by haul)	Bring to the above two WG's meetings
Final data 1q	1st June
Final data 4q	1st April

When sending the data to the ICES Secretariat the form in section 5.5 has to be filled in and send together with the records. This will provide an overview of the data for later use and help the entering of the data to the database.

5.2 Data Checking

A checking program is available from the ICES Secretariat. The program should be used to monitor and correct erroneous data by the responsible scientists of individual surveys. The first version was released in February 1999 and has during 1999 been updated on request. The ICES Secretariat expects that the checking program will fit the data when all the historical data have been delivered during 2000 and that only minor changes are needed in the future. Therefore, the program will only be updated after request of the BITS working group from 2001 and all countries will be asked to download the updated version from the ICES ftp-server.

The checking program is found on the ICES ftp-server under the directory /dist/lena/bitschk. An explanation on how to download the program is provided by ICES. In the same directory there is also a note explaining how to use the checking program.

5.3 Floppy Disk Requirements

The data has to be sent in ASCII coding on a 3.5 inch disks or by E-mail.

5.4 Format of data

Four distinct types of computer records have been defined for standard storage of the BITS data:

TYPE 1 : Record with detailed haul information
TYPE 1A: Record with additional haul information
TYPE 2 : Length frequency data
TYPE 4 : Sex-maturity-age-length keys (SMALK's) for ICES Sub-Division.

The detailed formats of these four record types are given in Sections 5.4.1–5.4.4 of the present manual.

Details of environmental data should be submitted to the Hydrographic Service of ICES according to established procedures. The national hydrographic station number must be reported in Record TYPE 1 to enable the link to be made between haul data and environmental data.

5.5 File structure and name

When delivering the data to the ICES Secretariat one file should only contain data from one year and survey. The name of the file should be month (the first day of the survey), country (ICES country code) and year, e.g. 03EST98.csv. In addition all the fish species the country intends to report have to be included in the file when sending it to the ICES Secretariat. Later corrections and updates can be made.

The records must be ordered in such a way that each record of TYPE 1 is followed by a variable number of records of TYPE 2, ordered by species. The number and kind of species recorded must agree with the species recording code as specified in record TYPE 1. For examples of the various codes see Appendix V.

Records of TYPE 4 should follow at the end of the file after the last species record of TYPE 2 for the last haul.
Records of TYPE 1A should be submitted in a separate file.

5.5.1 Record type 1

SPECIFICATIONS FOR RECORD TYPE 1 (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1-2	Record type	2A	M	HH	Fixed value: HH
3	Quarter	1N	M	1 to 4	
4-6	Country	3A	M	See Appendix III	ICES alpha codes for countries
7-10	Ship	4AN	M	See Appendix III	
11-20	Gear	10AN	M	See Appendix IV	Preliminary code 1)
21-26	Station number	6AN	O		National coding system
27-29	Haul no	3N	M	1 to 999	Sequential numbering by cruise
30-31	Year	2N	M	65 to 99 or 00 to 20	
32-33	Month	2N	M	1 to 12	
34-35	Day	2N	M	1 to 28/29/30/31	
36-39	Time shot	4N	M	1 to 2400, 9999	In UTC
40-42	Haul duration	3N	M	5 to 150	In minutes 2)
43	Day/night	1A	M	D, N, space	Not known = space filled
44-45	Lat. degrees	2N	M	53 to 66	Shooting position: Degree Lat.
46-47	Lat. minutes	2N	M	0 to 59	Shooting position: Minute Lat.
48-49	Lon. degrees	2N	M	11 to 31	Shooting position: Degree Lon.
50-51	Lon. minutes	2N	M	0 to 59	Shooting position: Minute Lon.
52	East/West	1A	M	E	Fixed value: E
53-55	Depth	3N	M	0, 10 to 150 5 to 150 in Sub-div. 22 + 24	Depth from surface in metres, 0=not known
56	Haul validity	1A	M	I, V, N	Invalid =I, Valid =V or no oxygen = N
57-64	Hydrographic station number	8AN	O		Station no as reported to the ICES hydrographer
65-66	Species Recording Code	2N	M	See Appendix V	Use position 65 for standard and 66 for bycatch codes
67-69	Netopening	3N	O	15 to 100	In metres x 10
70-73	Distance	4N	O	1850 to 9999	Distance towed over ground (m)
74-76	Warp lenght	3N	O	100 to 999	in metres
77-78	Warp diameter	2N	O	10 to 60	In millimetres
79-81	Door surface	3N	O	10 to 100	In squaremetres x 10
82-85	Door weight	4N	O	50 to 2000	In kilogrammes
86-89	Buoyancy	4N	O	50 to 200	In kilogrammes
90-91	Kite dimensions	2N	O	5 to 20	In squaremetres x 10
92-95	Weight ground rope	4N	O	0 to 800	In kilogrammes
96-98	Door spread	3N	O	25 to 200	In metres
99-100	Paddingfield	2A	M	Spaces	Filled up with spaces

* All numeric fields (N) right justified, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M=mandatory, O=optional.
For all optional fields spaces are valid and indicate not known.

COMMENTS:

1) ICES is maintaining this code list. Laboratories should ask the Secretariat for new codes, if the gear they report is not included in the list. Numerical information on gear aspects is defined in position 67-98 and is only required for the GOV trawl.

2) For the historical data a haul duration up to 150 minutes is legal. For present data the haul duration must not be longer than 90 minutes.

5.5.2 Record Type 1A

SPECIFICATIONS FOR RECORD TYPE 1A (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1-2	Record type	2A	M	HE	Fixed value: HE
3	Quarter	1N	M	1 to 4	
4-6	Country	3A	M	See Appendix III	ICES alpha codes for countries
7-10	Ship	4AN	M	See Appendix III	
11-20	Gear	10AN	M	See Appendix IV	Preliminary code 1)
21-26	Station number	6AN	O		National coding system
27-29	Haul no	3N	M	1 to 999	Sequential numbering by cruise
30-31	Year	2N	M	65 to 99 or 00 to 20	
32-33	Lat. degrees	2N	M	53 to 66	Hauling position: Degree Lat.
34-35	Lat. minutes	2N	M	0 to 59	Hauling position: Minute Lat.
36-37	Lon. degrees	2N	M	11 to 31	Hauling position: Degree Lon.
38-39	Lon. minutes	2N	M	0 to 59	Hauling position: Minute Lon.
40	East/West	1A	M	E	Fixed value: E
41-43	Towing direction	3N	O	1 to 360	
44-45	Ground speed	2N	O	20 to 60	Ground speed of trawl. Knots x 10
46-47	Seed through water	2N	O	10 to 99	Trawl speed through. Knots x 10
48-49	Wing spread	2N	O	12 to 30	Metres
50-52	Surface current direction	3N	O	0 to 360	Slack water =0
53-55	Surface current speed	3N	O	0 to 100	Metres per sec x 10
56-58	Bottom current direction	3N	O	0 to 360	Slack water =0
59-61	Bottom current speed	3N	O	0 to 100	Metres per sec x 10
62-64	Wind direction	3N	O	0 to 360	0 = carm
65-67	Wind speed	3N	O	0 to 100	Metres per sec
68-70	Swell direction	3N	O	0 to 360	
71-73	Swell height	3N	O	0 to 999	Metres x 10
74-100	Paddingfield	27A	M	Spaces	Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M=mandatory, O=optional.
For all optional fields spaces are valid and indicate not known.

COMMENTS:

1) ICES is maintaining this code list. Laboratories should ask the Secretariat for new codes, if the gear they report is not included in the list. Numerical information on gear aspects is only required for the GOV trawl.

5.5.3 Record Type 2

SPECIFICATIONS FOR RECORD TYPE 2 (Length frequency distribution)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1-2	Record type	2A	M	HL	Fixed value: HL
3	Quarter	1N	M	1 to 4	See Record Type 1
4-6	Country	3A	M	See Appendix III	See Record Type 1
7-10	Ship	4AN	M	See Appendix III	See Record Type 1
11-20	Gear	10AN	M	See Appendix IV	See Record Type 1
21-26	Station number	6AN	O		See Record Type 1
27-29	Haul no	3N	M	1 to 999	See Record Type 1
30-31	Year	2N	M	65 to 99 or 00 to 20	See Record Type 1
32-41	Species code	10 A	M	See Appendix VII	Official NODC code
42-43	Validity code	2N	M	See Appendix VIII	
44-50	No/hour	7N	M	0 to 9999999	No specimen caught per hour
51-55	Catch weight/Hour	5N	M	0 to 99999, spaces	In 100g. Not known = spaces
56-58	No measured	3N	M	0 to 999, spaces	Not known = spaces
59	Length class code	1AN	M	., 0, 1, 2, 5, 9	0.1 cm length class=. 0.5 cm length class = 0 1 cm length class = 1 2 cm length class = 2 5 cm length class = 5 +group =9
60-62	Min. length class	3N	M	1 to 999, spaces	Identifier of lower bound of length distribution, eg. 65-70 cm=65 For classes less than 1 cm there will be an implied decimal point after the 2nd digit, eg. 30.5-31.0 cm=305
63-68	No at length/hour	6N	M	1 to 999999, spaces	Length classes with zero catch should be excluded from the record (no/hour equals the sum of no at length).
69	Sex	1A	O		Male = M, Female =F
70-100	Paddingfield	31A	M	Spaces	Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information. All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M=mandatory, O=optional. For all optional fields spaces are valid and indicate not known.

COMMENTS:

1) Total catch weights should be given per hour fishing.
2) If the number measured is zero then the remainder of the record should be filled with spaces.
3) Size classes smaller than those defined in the BITS manual for reporting length distributions of the various species are allowed.

5.5.4 Record Type 4

SPECIFICATION FOR RECORD TYPE 4 (SMALK's)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS 1)
1-2	Record type	2A	M	CA	Fixed value: CA
3	Quarter	1N	M	1 to 4	See Record Type 1
4-6	Country	3A	M	See Appendix III	See Record Type 1
7-10	Ship	4AN	M	See Appendix III	See Record Type 1
11-20	Gear	10AN	M	See Appendix IV	See Record Type 1
21-26	Station number	6AN	O		See Record Type 1
27-29	Haul no	3N	M	1 to 999	See Record Type 1
30-31	Year	2N	M	65 to 99 or 00 to 20	See Record Type 1
32-41	Species code	10A	M	See Appendix VII	Official NODC code
42-43	Sub-Division area	2N	M	22 to 32, see Appendix IX	ICES Baltic Sub-Division code 7)
44-47	Rectangle area	4 AN	M	See Appendix IX	ICES Statistical Rectangles
48-51	Paddingfield	4 A	M	Spaces	Filled up with spaces
52	Length class code	1AN	M	., 0, 1, 2, 5	0.1 cm length class =. 0.5 cm length class = 0 1 cm length class = 1 2 cm length class = 2 5 cm length class = 5 (+group not allowed) 2)
53-55	Min. length class	3N	M	1 to 999, spaces	Identifier of lower bound of length distribution, eg. 65-70 cm=65 For classes less than 1 cm there will be an implied decimal point after the 2nd digit, eg. 30.5-31.0 cm=305
56	Sex	1A	M	M, F, space	Male = M, Female = F, Unknown = space
57	Maturity	1AN	M	1 to 5, space	See Appendix I 3)
58	+group identifier	1A	M	+, space	Plus group = +, else space 4)
59-60	Age	2N	M	0 to 99, spaces	Unknown age =spaces 5)
61-63	Number	3N	M	1 to 999	6)
64-68	Individual mean weight (g)	5N	O	0 to 99999, spaces	The mean weight of the number of fish in the record (in gram).
68-100	Paddingfield	32 A	M	Spaces	Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information. All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M=mandatory, O=optional. For all optional fields spaces are valid and indicate not known.

COMMENTS:

1) Otolith samples may refer to an individual haul or to groups of hauls in the same rectangle or within one sampling area, depending on the procedures on board. If detailed information is available, it would seem appropriate to refer back to the haul no and/or rectangle; these data are optional rather than mandatory.
2) See Record Type 2.
3) Sex maturity data are explicitly demanded for cod.
4) A plus group refers to the age indicated AND older, respectively to a reading of more than or equal to the specified number of rings.
5) For herring and sprat the number of rings must be recorded. For all other species the age.
6) An additional field has been reserved for no of fish, which allows the information to be presented in a more aggregated form, rather than that identical information has to be recorded for all individual fish of the same size, sex, maturity and age group.
7) Standard ICES Sub-Division (22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32)

5.6 Input BITS data

Checklist with detailed information per survey compiled by: ....date: ....

Year:
Quarter:
Country:
Vessel:
Fishing gear:
Mesh size in the codend (in mm):
Comments on gear:
Hydrography (y/n):
  Stations no.:
  CTD-probe (y/n):
  Surface temperature (y/n):
  Bottom temperature (y/n):
  Surface salinity (y/n):
  Bottom salinity (y/n):
  Bottom oxygen (y/n):
Haul duration:
Day/night (trawling):
Other comments:

ICES Sub-division:	22	23	24	25	26	27	28	29	30	31	32
Number of hauls:											

STANDARD SPECIES:	Measured (y/n)	Aged (n - no, o - otoliths, s - scale)	Aged plus group used	Grouped by what stratification? (depth or ICES-rec.)	Sex (y/n)	Maturity (y/n)	Fish health condition (y/n)	Stomach fullness (y/n)
Herring:								
Sprat:								
Cod:								
Flounder:								

BYCATCH	Measured (y/n)	Counted (y/n)	Aged (y/n)
Plaice:			
Dab:			
Turbot:			
Brill:			
Sole:			
All other bychatch:			

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APPENDIX I MATURITY KEY

1.VIRGIN

Male: Testes very thin translucent ribbon lying along an unbranched blood vessel. No sign of development.

Female: Ovaries small, elongated, whitish, translucent. No sign of development.

2. MATURING

Male: Development has obviously started, colour is progressing towards creamy white and the testes are filling more and more of the body cavity but sperm cannot be extruded with only moderate pressure.

Female: Development has obviously started, eggs are becoming larger and the ovaries are filling more and more of the body cavity but eggs cannot be extruded with only moderate pressure.

3. SPAWNING

Male: Will extrude sperm under moderate pressure to advanced stage of extruding sperm freely with some sperm still in the gonad.

Female: Will extrude eggs under moderate pressure to advanced stage of extruding eggs freely with some eggs still in the gonad.

4. SPENT

Male: Testes shrunken with little sperm in the gonads but often some in the gonoducts which can be extruded under light pressure.

Female: Ovaries shrunken with few residual eggs and much slime. Resting condition, firm, not translucent, showing no development.

5. RESTING (see remarks in ICES CM 1997/J:4, chapter 2.5)

Male: Testes firm, not translucent, showing no development.

Female: Ovaries firm, not translucent, showing no development.

Possibilities to classify the maturity stages of the BITS key:

Maturity stage (BITS code)	**Purpose of classification** Estimation of spawning stock size	Estimation of sexual maturity
1. VIRGIN	Immature (nonspawner)	immature
2. MATURING	mature (spawner)	mature
3. SPAWNING	mature (spawner)	mature
4. SPENT	mature (spawner)	mature
5. RESTING	‘immature’ (nonspawner)	mature

APPENDIX II – CONVERSION TABLES FOR MATURITY KEYS

The table convert the codes of the national maturity keys into the codes of the BITS key for cod.

Country	BITS	Denmark	Estonia	Finland	Germany	Latvia	Poland	Russia	Sweden
Species	All	Cod	All		Cod	Cod	Cod	Cod	Cod
Source	ICES (1997)	Modif. from Maier (1908), Berner (1960)	Kiselevich (1923), Pravdin (1966)	not available	Modif. from Maier (1908). Berner (1960)	Kiselevich (1923), Pravdin (1966)	Maier (1908), Chrzan (1951)	Sorokin (1957, 1960) modified by Alekseev, Allekseeva (1996)	Modif. from Maier (1908)
Maturity stage ([1])	Code								
VIRGIN (immature)	1	I,II	I		I	Juvenis, II	I	Juv., II	I
MATURING (mature)	2	III-V	II-IV		III-V	III, IV	III-V	III, IV	III-V
SPAWNING (mature)	3	VI,VII	V		VI,VII	V	VI,VII	V, VI (V), VI (IV)	VI
SPENT	4	VIII	VI		VIII	VI	VIII	VI	VII,VIII
RESTING (mature/ immature[2])	5	IX,X	II		II	II	II	VI - II	II

[1]sexual maturity for estimating the proportion of spawners.

[2]should be used when the investigation was during the prespawning and early spawning time (still no spent individuals).
Individuals will not contribute to the spawning stock in the present year.

The table convert the codes of the national maturity key into the codes of the BITS key for herring

Country	BITS	Denmark	Estonia	Finland	Germany	Latvia	Poland	Russia	Sweden
Species	All		All		Herring	Herring	Herring	Herring	Herring
Source	ICES (1997)		Kiselevich (1923),		Modif. from	Kiselevich (1923)	Modif. fr. Maier.	Kiselevich (1923)	ICES (1962)
			Pravdin (1966)	not available	Heincke (1998)		Popiel (1955)		
							Strzyzewska(1969)		
<u>Maturity stage</u> ([1])	<u>Code</u>								
VIRGIN (immature)	1		I		I	I	I,II	Juv., II	I,II
MATURING (mature)	2		II-IV		III,IV	III, IV	III-V	III, IV	III-V
SPAWNING (mature)	3		V		V,VI	V	VI,VII	V	VI
SPENT (mature)	4		VI		VII,VIII	VI	VIII	VI	VII
RESTING (mature/ immature[2])	5		II		II, IX	II (VI)	-	VI (II)	VIII

[1]sexual maturity for estimating the proportion of spawners.

[2]should be used when the investigation was during the prespawning and early spawning time (still no spent individuals).

Individuals will not contribute to the spawning stock in the present year.

The table convert the codes of the national maturity key into the codes of the BITS key for sprat

Country	BITS	Denmark	Estonia	Finland	Germany	Latvia	Poland	Russia	Sweden
Species	All		All		Sprat	Sprat	Sprat	Sprat	
Source	ICES(1997)	No estimations	Kiselevich (1923), Pravdin (1966)	not available	Rechlin (unpublished)	Alekseev, Alekseeva (1996)	Maier (1908), Elwertowski (1957)	Alekseev, Alekseeva (1996)	not available
Maturity stage ([1])	Code								
VIRGIN (immature)	1		I		I	I	I	Juv., II	
MATURING (mature)	2		II-IV		III,IV	III, IV, VI (III) VI (IV)	III-V	III, IV	
SPAWNING (mature)	3		V		V,VI	V, VI (V)	VI,VII	V, VI (V), VI (IV)	
SPENT (mature)	4		VI		VII,VIII	VI	VIII	VI	
RESTING (mature/ immature[2])	5		II		II	II	II	VI (II)	

[1]sexual maturity for estimating the proportion of spawners (mature individuals).

[2]should be used when the investigation was during the prespawning and early spawning time (still no spent individuals)
Individuals will not contribute to the spawning stock in the present year.

The table convert the codes of the national maturity key into the codes of the BITS key for flatfishes

Country Species Source	BITS All ICES (1997)	Denmark not available	Estonia All Kiselevich (1923), Pravdin (1966)	Finland not available	Germany Flatfish Maier (1908)	Latvia Kiselevich (1923), Pravdin (1966)	Poland Flatfish Maier (1908)	Russia Alekseev, Alekseeva (1996)	Sweden not available
<u>Maturity stage</u> ([1])	<u>Code</u>								
VIRGIN (immature)	1		I		I	Juvenis, II	I	Juv., II	
MATURING (mature)	2		II-IV		III-V	III, VI	III-V	III, IV	
SPAWNING (mature)	3		V		VI,VII	V	VI,VII	V, VI (V), VI (IV)	
SPENT (mature)	4		VI		VIII	VI	VIII	VI	
RESTING (mature/ immature[2])	5		II		II	II	II	VI (II)	

[1] sexual maturity for estimating the proportion of spawners (mature individuals).

[2] should be used when the investigation was during the prespawning and early spawning time (still no spent individuals).
Individuals will not contribute to the spawning stock in the present year.

APPENDIX III – ALPHA CODES FOR COUNTRIES AND SHIPS

COUNTRY	ICES CODE 1)	SHIP´S NAME	BITS CODE
Denmark	DEN	Dana (old)	DAN
		Dana (new)	DAN2
		J.C. Svabo	JCS
		Havfisken	HAF
		Havkatten	HAK
Germany	GFR	Anton Dohrn (old)	AND
		Anton Dohrn (new)	AND2
		Solea	SOL
		Walther Herwig	WAH
		Clupea	CLP
		Eisbär	EIS
Sweden	SWE	Thesis	THE
		Skagerak	SKA
		Argos	ARG
		Ancylus	ACY
Estonia	EST	Koha	KOH
Finland	FIN		
Latvia	LAT 1)	Baltijas Petnieks	BPE
		Zvezda Baltiki	ZBA
		Monokristal	MON
		Commercial Latvia Vessel	CLV
Poland	POL	Baltica	BAL
		Commercial Vessel	GDY
Russia	RUS	Monokristal	MON
		Atlantida	ATLD
		Atlantniro	ATL
Lithuania	LTU 1)	Darius	DAR

Note 1). Country code for Latvia and Lithuania codes refer to the FAO, ISO Alpha 3 code system.

APPENDIX IV – ALPHA NUMERIC CODES

FOR DEMERSL TRAWL GEARS

TRAWL SPECIFICATION	TRAWL POPULAR NAME	RESEARCH VESSEL
DT	Russian bottom trawl	Monokristal
LPT	Latvian Pelagic Trawl	Baltijas Petnieks, Zvezda Baltiki
LBT	Latvian Bottom trawl	Baltijas Petnieks
GOV	Grand Overture Verticale	Argos, Dana
DBT	Danish bottom trawl	Dana
EXP	Danish winged bottom trawl	Dana
SON	Sonderborg trawl	Clupea, Solea
H20	Herring ground trawl (H20/25)	Solea, Eisbär
P20	Herring bottom trawl (P20/25)	Commercial Vessel, Baltica
TV1	Large TV trawl	Havfisken
TV2	Small TV trawl	Havkatten
FOT	Fotö bottom trawl	Argos
LCT	Lithuanian cod trawl	Darius
ESB	Estonian small bottom trawl	Koha
HAK	Hake-4M	Atlantniro, Atlantida
CHP	Cod Hopper	Solea
MWT	Mid water trawl 664	Solea
TV3	TV trawl	All vessels

Within the gear field the following positions have been reserved for recording various types of rigging:
Position 14-16: Sweep length in m. (Numeric, right justified, zero filled. Spaces for unknown. Code 000 indicates the semi-pelagic rigging, this specification is associated with the GOV.)
Position 17: Exceptions (B=Bobbins used, D=Double sweeps, space=standard or not known).
Position 18: Door type (P=Polyvalent, V=Vee F=Flat, K=Karm Waco, space=others or not known).

Further quantitative numeric information on rigging of gear is defined in positions 74-95, in Record Type 1.

NB: This code must still be considered as a preliminary one. More detailed information on the gears used in the past is required before a completely comprehensive coding system can be developed.

APPENDIX V – RECORDED SPECIES CODES USED IN RECORD TYPE 1

Standard species for Baltic International Trawl surveys are listed in Appendix VI. NODC species codes are given in Appendix VII.

NB: Zero catches of a particular species in a haul may be included in or excluded from the file. However, any species deliberately excluded from a subset, or an invalid species for a particular haul, should be included for each haul with a species validity code 0 !!.

RECORDED STANDARD SPECIES LIST CODES (POSITION 65)

0 = No standard species recorded		
1 = All (4) standard species recorded		
2 = Pelagic (2) standard species recorded	Note	1)
3 = Bottom (2) standard species recorded		1)
4 = Individual (1) standard species recorded		2)

RECORDED BY-CATCH SPECIES LIST CODES (POSITION 66)

0 = No by-catch species recorded	
1 = Open ended by-catch list - All species recorded	
4 = Closed by-catch list - Only flatfish (4) species recorded	1)

1) For definition see Appendix VI.
2) If this code is applied, zero catches of the species recorded must be recorded in Record Type 2 format.

APPENDIX VI – OFFICIAL 10-NUMERIC NODC SPECIES CODES FOR STANDARD AND CLOSED BY-CATCH LISTS

REPORTED GROUP	SPECIES	NODC code
Standard Pelagic species	Herring	8747010201
	Sprat	8747011701
Standard Bottom species	Cod	8791030402
	Flounder	8857041402
By-catch Flatfish	Plaice	8857041502
	Dab	8857040904
	Turbot	8857030402
	Brill	8857030403
	Sole	8858010601

APPENDIX VII – OFFICIAL NODC CODE FOR FISH SPECIES (IN TAXONOMIC ORDER)

8603010000	Petromyzonidae		
8603010200	Lampetra	8603010217	Lampetra fluviatilis
		8603010218	Lampetra planeri
8603010300	Petromyzon	8603010301	Petromyzon marinus
8606010000	Myxinidae		
8606010200	Myxine	8606010201	Myxine glutinosa
8705010000	Chlamydoselachidae		
8705010100	Chlamydoselach	8705010101	Chlamydoselach anguineus
8705020000	Hexanchidae		
8705020100	Hexanchus	8705020101	Hexanchus griseus
8707040000	Lamnidae		
8707040200	Cetorhinus	8707040201	Cetorhinus maximus
8707040300	Lamna	8707040302	Lamna nasus
8707040400	Alopias	8707040401	Alopias vulpinus
8707040500	Isurus	8707040501	Isurus oxyrhinchus
8708010000	Scyliorhinidae		
8708010200	Galeus	8708010203	Galeus melastomus
8708010300	Scyliorhinus	8708010306	Scyliorhinus caniculus
		8708010307	Scyliorhinus stellaris
8708010700	Pseudotriakis	8708010701	Pseudotriakis microdon
8708020000	Carcharinidae		
8708020100	Galeorhinus	8708020102	Galeorhinus galeus
8708020200	Galeocerdo	8708020201	Galeocerdo cuvier
8708020400	Mustelus	8708020408	Mustelus asterias
		8708020409	Mustelus mustelus
		8708020410	Mustelus punctulatus
8708020600	Prionace	8708020601	Prionace glauca
8708030000	Sphyrnidae		
8708030100	Sphyrna	8708030102	Sphyrna zygaena
		8708030103	Sphyrna lewini
		8708030105	Sphyrna tudes
8710010000	Squalidae		
8710010100	Somniosus	8710010102	Somniosus microcephalus
8710010200	Squalus	8710010201	Squalus acanthias
		8710010204	Squalus blainvillei
8710010300	Centrophorus	8710010301	Centrophorus granulosus
		8710010302	Centrophorus squamosus
		8710010303	Centrophorus uyato
8710010400	Dalatias	8710010401	Dalatias licha
8710010500	Etmopterus	8710010503	Etmopterus princeps
		8710010510	Etmopterus spinax
8710010700	Oxynotus	8710010702	Oxynotus centrina
		8710010703	Oxynotus paradoxus
8710010900	Centroscyllium	8710010901	Centroscyllium fabricii
8710011000	Echinorhinus	8710011001	Echinorhinus brucus
8710011200	Centroscymnus	8710011201	Centroscymnus coelolepis
		8710011202	Centroscymnus crepidater
8710011400	Deania	8710011401	Deania calceus
8710011600	Scymnodon	8710011601	Scymnodon ringens
		8710011602	Scymnodon obscurus
8711010000	Squatinidae		
8711010100	Squatina	8711010103	Squatina squatina
8713030000	Torpedinidae		
8713030100	Torpedo	8713030102	Torpedo nobiliana
		8713030104	Torpedo torpedo
		8713030105	Torpedo marmorata
8713040000	Rajidae		
8713040100	Raja	8713040134	Raja radiata
		8713040138	Raja brachyura
		8713040140	Raja microocellata
		8713040141	Raja montagui

		8713040142	Raja hyperborea
		8713040143	Raja batis
		8713040144	Raja nidarosiensis
		8713040145	Raja oxyrhynchus
		8713040146	Raja fullonica
8713040147	Raja circularis		
		8713040148	Raja naevus
		8713040150	Raja fyllae
		8713040151	Raja alba
		8713040153	Raja lintea
		8713040158	Raja undulata
		8713040159	Raja clavata
8713040800	Bathyraja	8713040801	Bathyraja pallida
		8713040803	Bathyraja spinicauda
8713050000	Dasyatidae		
8713050100	Dasyatis	8713050141	Dasyatis pastinacus
8713070000	Myliobatidae		
8713070200	Myliobatis	8713070204	Myliobatis aquila
8713080000	Mobulidae		
8713080200	Mobula	8713080205	Mobula mobular
8716020000	Chimaeridae		
8716020100	Hydrolagus	8716020103	Hydrolagus mirabilis
8716020200	Chimaera	8716020202	Chimaera monstrosa
8716030000	Rhinochimaeridae		
8716030200	Rhinochimaera	8716030201	Rhinochimaera atlantica
8729010000	Acipenseridae		
8729010100	Acipenser	8729010107	Acipenser sturio
8741010000	Anguillidae		
8741010100	Anguilla	8741010102	Anguilla anguilla
8741050000	Muraenidae		
8741050500	Muraena	8741050505	Muraena helena
8741120000	Congridae		
8741120100	Conger	8741120111	Conger conger
8741150000	Synaphobranchidae		
8741150100	Synaphobranchus	8741150104	Synaphobranchus kaupi
8741200000	Serrivomeridae		
8741200100	Serrivomer	8741200102	Serrivomer beani
		8741200104	Serrivomer parabeani
8741210000	Nemichthyidae		
8741210100	Avocettina	8741210102	Avocettina infans
8741210200	Nemichthys	8741210202	Nemichthys scolopaceus
8743030000	Notacanthidae		
8743030200	Polyacanthonotus	8743030204	Polyacanthonotus rissoanus
8743030300	Notocanthus	8743030301	Notocanthus chemnitzii
		8743030302	Notocanthus bonaparti
8747010000	Clupeidae		
8747010100	Alosa	8747010107	Alosa alosa
		8747010109	Alosa fallax
8747010200	Clupea	8747010201	Clupea harengus
8747011700	Sprattus	8747011701	Sprattus sprattus
8747012200	Sardina	8747012201	Sardina pilchardus
8747020000	Engraulidae		
8747020100	Engraulis	8747020104	Engraulis encrasicolus
8755010000	Salmonidae		
8755010100	Coregonus	8755010115	Coregonus oxyrhynchus
		8755010116	Coregonus albula
8755010200	Oncorhynchus	8755010201	Oncorhynchus gorbuscha
		8755010202	Oncorhynchus keta
8755010300	Salmo	8755010302	Salmo gairdneri
		8755010305	Salmo salar
		8755010306	Salmo trutta
8755010400	Salvelinus	8755010402	Salvelinus alpinus
		8755010404	Salvelinus fontinalis

8755010700	Thymallus	8755010704	Thymallus thymallus
8755010800	Hucho	8755010801	Hucho hucho
8755030000	Osmeridae		
8755030200	Mallotus	8755030201	Mallotus villosus
8755030300	Osmerus	8755030301	Osmerus eperlanus
8756010000	Argentinidae		
8756010200	Argentina	8756010203	Argentina silus
		8756010237	Argentina sphyraena
8758010000	Esocidae		
8758010100	Esox	8758010101	Esox lucius
8758020000	Umbridae		
8758020100	Umbra	8758020101	Umbra pygmaea
8758020103	Umbra krameri		
8759010000	Gonostomatidae		
8759010500	Maurolicus	8759010501	Maurolicus muelleri
8759020000	Sternoptychidae		
8759020100	Argyropelecus	8759020107	Argyropelecus olfersii
8760010000	Alepocephalidae		
8760010300	Alepocephalus	8760010302	Alepocephalus rostratus
		8760010305	Alepocephalus bairdi
8762070000	Paralepididae		
8762070200	Notolepis	8762070201	Notolepis rissoi
8762070400	Paralepis	8762070402	Paralepis coregonoides
8762140000	Myctophidae		
8762140300	Lampanyctus	8762140317	Lampanyctus crocodilus
8776010000	Cyprinidae		
8776010600	Notemigonus	8776010601	Notemigonus crysoleucas
8776014900	Abramis	8776014901	Abramis brama
8776017400	Rutilus	8776017401	Rutilus rutilus
8776019900	Vimba	8776019901	Vimba vimba
8784010000	Gobiesocidae		
8784010600	Lepadogaster	8784010601	Lepadogaster candollei
		8784010603	Lepadogaster lepadogaster
8784010700	Diplecogaster	8784010701	Diplecogaster bimaculata
8784010800	Apletodon	8784010801	Apletodon microcephalus
8786010000	Lophiidae		
8786010100	Lophius	8786010103	Lophius piscatorius
		8786010104	Lophius budegassa
8787020000	Antennariidae		
8787020200	Histrio	8787020201	Histrio histrio
8787020200	Antennarius	8787020203	Antennarius radiosus
8788030000	Himantolophiidae		
8788030200	Himantolophus	8788030201	Himantolophus groenlandicus
8788100000	Linophrynidae		
8788100100	Linophryne	8788100102	Linophryne lucifer
8791010000	Moridae		
8791010100	Antimora	8791010101	Antimora rostrata
8791010200	Laemonema	8791010203	Laemonema latifrons
8791010400	Mora	8791010401	Mora moro
8791010500	Lepidion	8791010501	Lepidion eques
8791010600	Halargyreus	8791010601	Halargyreus affinis
8791030000	Gadidae		
8791030200	Boreogadus	8791030201	Boreogadus saida
8791030400	Gadus	8791030402	Gadus morhua
8791030800	Lota	8791030801	Lota lota
8791030900	Pollachius	8791030901	Pollachius virens
		8791030902	Pollachius pollachius
8791031100	Brosme	8791031101	Brosme brosme
8791031300	Melanogrammus	8791031301	Melanogrammus aeglefinus
8791031500	Rhinonemus	8791031501	Rhinonemus cimbrius
8791031600	Phycis	8791031602	Phycis blennoides
8791031700	Trisopterus	8791031701	Trisopterus minutus
		8791031702	Trisopterus luscus

		8791031703	Trisopterus esmarki
8791031800	Merlangius	8791031801	Merlangius merlangus
8791031900	Molva	8791031901	Molva molva
		8791031902	Molva dipterygia
		8791031904	Molva macropthalma
8791032000	Gaidropsurus	8791032001	Gaidropsurus vulgaris
		8791032002	Gaidropsurus mediterraneus
8791032100	Gadiculus	8791032101	Gadiculus argenteus
8791032200	Micromesistius	8791032201	Micromesistius poutassou
8791032300	Raniceps	8791032301	Raniceps raninus
8791032400	Ciliata	8791032401	Ciliata mustela
		8791032402	Ciliata septentrionalis
8791032500	Onogadus	8791032501	Onogadus argenteus
8791032600	Antonogadus	8791032601	Antonogadus macropthalmus
8791040000	Merluccidae		
8791040100	Merluccius	8791040105	Merluccius merluccius
8792010000	Ophidiidae		
8792010600	Ophidion	8792010607	Ophidion barbatum
8792020000	Carapidae		
8792020200	Echiodon	8792020202	Echiodon drummondi
8793010000	Zoarcidae		
8793010500	Lycenchelys	8793010513	Lycenchelys sarsi
8793010700	Lycodes	8793010724	Lycodes vahlii
		8793010725	Lycodes esmarkii
8793012000	Zoarces	8793012001	Zoarces viviparus
8794010000	Macrouridae		
8794010100	Coryphaenoides	8794010117	Coryphaenoides rupestris
8794010600	Malacocephalus	8794010601	Malacocephalus laevis
8794010800	Nezumia	8794010801	Nezumia aequalis
8794011500	Trachyrhynchus	8794011501	Trachyrhynchus trachyrhynchus
		8794011502	Trachyrhynchus murrayi
8794011600	Macrourus	8794011601	Macrourus berglax
8803010000	Exocoetidae		
8803010100	Cypselurus	8803010101	Cypselurus heterurus
		8803010106	Cypselurus pinnatibarbatus
8803010500	Danichthys	8803010501	Danichthys rondeletii
8803010700	Exocoetus	8803010701	Exocoetus obtusirostris
8803020000	Belonidae		
8803020500	Belone	8803020502	Belone belone
8803030000	Scomberesocidae		
8803030200	Scomberesox	8803030201	Scomberesox saurus
8805020000	Atherinidae		
8805021000	Atherina	8805021002	Atherina boyeri
		8805021003	Atherina presbyter
8810010000	Diretmidae		
8810010100	Diretmus	8810010101	Diretmus argenteus
8810020000	Trachichthyidae		
8810020100	Gephyroberyx	8810020101	Gephyroberyx darwini
8810020200	Hoplostethus	8810020201	Hoplostethus atlanticus
		8810020202	Hoplostethus mediterraneus
8810050000	Berycidae		
8810050100	Beryx	8810050101	Beryx decadactylus
		8810050102	Beryx splendens
8811030000	Zeidae		
8811030300	Zeus	8811030301	Zeus faber
8811060000	Caproidae		
8811060300	Capros	8811060301	Capros aper
8813010000	Lampridae		
8813010100	Lampris	8813010102	Lampris guttatus
8815020000	Trachipteridae		
8815020100	Trachipterus	8815020102	Trachipterus arcticus
8815030000	Regalecidae		
8815030100	Regalecus	8815030101	Regalecus glesne

8818010000	Gasterosteidae		
8818010100	Gasterosteus	8818010101	Gasterosteus aculeatus
8818010200	Pungitius	8818010201	Pungitius pungitius
8818010500	Spinachia	8818010501	Spinachia spinachia
8819030000	Macrorhamphosidae		
8819030100	Macrorhamphosus	8819030101	Macrorhamphosus scolopax
8820020000	Syngnathidae		
8820020100	Syngnathus	8820020119	Syngnathus rostellatus
		8820020120	Syngnathus acus
		8820020123	Syngnathus typhle
8820020200	Hippocampus	8820020209	Hippocampus hippocampus
		8820020210	Hippocampus ramulosus
8820022100	Entelurus	8820022101	Entelurus aequoreus
8820022200	Nerophis	8820022201	Nerophis lumbriciformis
		8820022202	Nerophis ophidion
8826010000	Scorpaenidae		
8826010100	Sebastes	8826010139	Sebastes marinus
		8826010151	Sebastes mentella
		8826010175	Sebastes viviparus
8826010300	Helicolenus	8826010301	Helicolenus dactylopterus
8826010600	Scorpaena	8826010628	Scorpaena scropha
		8826010629	Scorpaena porcus
8826011100	Trachyscorpia	8826011101	Trachyscorpia cristulata
8826020000	Triglidae		
8826020300	Peristedion	8826020316	Peristedion cataphractum
8826020500	Trigla	8826020501	Trigla lucerna
		8826020503	Trigla lyra
8826020600	Eutrigla	8826020601	Eutrigla gurnardus
8826020700	Trigloporus	8826020701	Trigloporus lastoviza
8826020800	Aspitrigla	8826020801	Aspitrigla cuculus
		8826020802	Aspitrigla obscura
8831010000	Icelidae		
8831010100	Icelus	8831010101	Icelus bicornis
8831020000	Cottidae		
8831020300	Artediellus	8831020308	Artediellus europaeus
8831020800	Cottus	8831020825	Cottus gobio
8831022200	Myoxocephalus	8831022205	Myoxocephalus quadricornis
		8831022207	Myoxocephalus scorpius
8831023800	Triglops	8831023807	Triglops murrayi
8831024600	Taurulus	8831024601	Taurulus bubalis
		8831024602	Taurulus lilljeborgi
8831080000	Agonidae		
8831080800	Agonus	8831080801	Agonus decagonus
		8831080803	Agonus cataphractus
8831090000	Cyclopteridae		
8831090200	Careproctus	8831090232	Careproctus longipinnis
		8831090233	Careproctus reinhardi
8831090800	Liparis	8831090828	Liparis liparis
		8831090860	Liparis montagui
8831091500	Cyclopterus	8831091501	Cyclopterus lumpus
8835020000	Serranidae		
8835020100	Morone	8835020102	Morone saxatilis
8835020400	Epinephelus	8835020435	Epinephelus guaza
8835022300	Serranus	8835022316	Serranus cabrilla
8835022800	Polyprion	8835022801	Polyprion americanus
8835160000	Centrarchidae		
8835160200	Ambloplites	8835160201	Ambloplites rupestris
8835160500	Lepomis	8835160505	Lepomis gibbosus
8835160600	Micropterus	8835160601	Micropterus dolomieui
		8835160602	Micropterus salmoides
8835180000	Apogonidae		
8835180400	Epigonus	8835180403	Epigonus telescopus
8835181200	Rhectogramma	8835181201	Rhectogramma sherborni

8835200200	Perca	8835200200	Perca fluviatilis
8835200400	Stizostedion	8835200403	Stizostedion lucioperca
8835200600	Gymnocephalus	8835200601	Gymnocephalus cernua
8835270000	Echeneidae		
8835270100	Remora	8835270103	Remora remora
8835280000	Carangidae		
8835280100	Trachurus	8835280103	Trachurus trachurus
		8835280105	Trachurus mediterraneus
		8835280106	Trachurus picturatus
8835280800	Seriola	8835280801	Seriola dumerili
8835280900	Trachinotus	8835280911	Trachinotus ovatus
8835281500	Naucrates	8835281501	Naucrates ductor
8835282400	Lichia	8835282401	Lichia amia
8835330000	Caristiidae		
8835330100	Caristius	8835330101	Caristius macropus
8835430000	Sparidae		
8835430100	Dentex	8835430102	Dentex macropthalmus
		8835430105	Dentex dentex
8835430600	Pagrus	8835430601	Pagrus pagrus
8835430800	Pagellus	8835430801	Pagellus bogaraveo
		8835430804	Pagellus erythrinus
8835430900	Boops	8835430901	Boops boops
8835431100	Sparus	8835431101	Sparus aurata
		8835431102	Sparus pagurus
8835431200	Spondyliosoma	8835431201	Spondyliosoma cantharus
8835440000	Sciaenidae		
8835441100	Umbrina	8835441107	Umbrina canariensis
		8835441108	Umbrina cirrosa
8835442700	Argyrosomus	8835442701	Argyrosomus regium
8835450000	Mullidae		
8835450200	Mullus	8835450202	Mullus surmuletus
		8835450203	Mullus barbatus
8835700000	Cepolidae		
8835700100	Cepola	8835700102	Cepola rubescens
8835710000	Bramidae		
8835710100	Brama	8835710102	Brama brama
8835710300	Pterycombus	8835710301	Pterycombus brama
8835710400	Taractes	8835710401	Taractes longipinnis
		8835710403	Taractes asper
8835720000	Dicentrarchidae		
8835720100	Dicentrarchus	8835720101	Dicentrarchus labrax
		8835720102	Dicentrarchus punctatus
8836010000	Mugilidae		
8836010100	Mugil	8836010101	Mugil cephalus
8836010700	Chelon	8836010704	Chelon labrosus
8836010900	Liza	8836010901	Liza ramada
		8836010902	Liza auratus
8839010000	Labridae		
8839012300	Coris	8839012306	Coris julis
8839013300	Crenilabrus	8839013301	Crenilabrus melops
8839013400	Centrolabrus	8839013401	Centrolabrus exoletus
8839013500	Ctenolabrus	8839013501	Ctenolabrus rupestris
8839013600	Labrus	8839013603	Labrus berggylta
		8839013605	Labrus mixtus
8839013700	Acantholabrus	8839013701	Acantholabrus palloni
8840060000	Trachinidae		
8840060100	Trachinus	8840060101	Trachinus vipera
		8840060102	Trachinus draco
8842010000	Blenniidae		
8842010100	Blennius	8842010104	Blennius ocellaris
		8842010110	Blennius gattorugine
		8842010115	Blennius pholis
8842012400	Coryphoblennius	8842012401	Coryphoblennius galerita

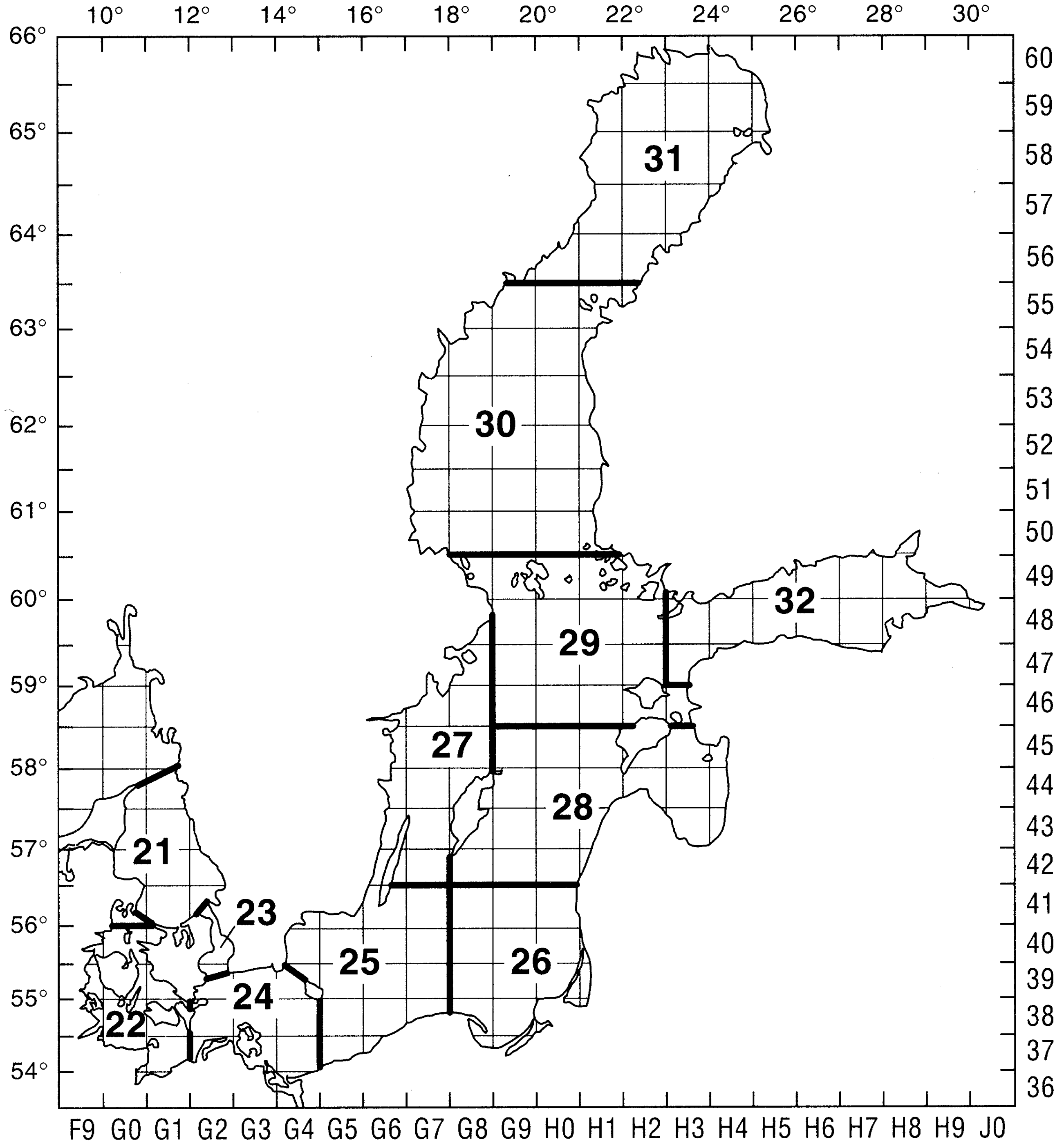
8842020000	Anarhichadidae		
8842020100	Anarhichas	8842020102	Anarhichas denticulatus
		8842020103	Anarhichas lupus
		8842020104	Anarhichas minor
8842120000	Stichaeidae		
8842120500	Chirolophis	8842120505	Chirolophis ascanii
8842120900	Lumpenus	8842120905	Lumpenus lampretaeformis
8842121800	Leptoclinus	8842121801	Leptoclinus maculatus
8842130000	Pholididae		
8842130200	Pholis	8842130209	Pholis gunnellus
8845010000	Ammodytidae		
8845010100	Ammodytes	8845010105	Ammodytes tobianus
		8845010106	Ammodytes marinus
8845010200	Gymnammodytes	8845010201	Gymnammodytes semisquamatus
8845010300	Hyperoplus	8845010301	Hyperoplus lanceolatus
		8845010302	Hyperoplus immaculatus
8846010000	Callionymidae		
8846010100	Callionymus	8846010106	Callionymus lyra
		8846010107	Callionymus maculatus
		8846010120	Callionymus reticulatus
8847010000	Gobiidae		
8847011300	Gobius	8847011304	Gobius auratus
		8847011307	Gobius cobitis
		8847011308	Gobius cruentatus
		8847011316	Gobius niger
		8847011320	Gobius paganellus
		8847011325	Gobius gasteveni
8847014900	Crystallogobius	8847014901	Crystallogobius linearis
8847015000	Gobiusculus	8847015001	Gobiusculus flavescens
8847015100	Pomatoschistus	8847015101	Pomatoschistus minutus
		8847015102	Pomatoschistus pictus
		8847015103	Pomatoschistus microps
		8847015104	Pomatoschistus norvegicus
8847016500	Lebetus	8847016501	Lebetus orca
		8847016502	Lebetus guilleti
8847016600	Aphia	8847016601	Aphia minuta
8847016700	Lesueurigobius	8847016702	Lesueurigobius friesii
8847016800	Buenia	8847016802	Buenia jeffreysii
8847016900	Thorogobius	8847016901	Thorogobius ephippiatus
8847017500	Neogobius	8847017500	Neogobius melanostomus
8850010000	Gemplydae		
8850010400	Ruvettus	8850010401	Ruvettus pretiosus
8850010700	Nesarchus	8850010701	Nesarchus nasutus
8850020000	Trichiuridae		
8850020100	Benthodesmus	8850020101	Benthodesmus simonyi
8850020200	Trichiurus	8850020201	Trichiurus lepturus
8850020300	Aphanopus	8850020301	Aphanopus carbo
8850020400	Lepidopus	8850020401	Lepidopus caudatus
8850030000	Scombridae		
8850030100	Euthynnus	8850030101	Euthynnus pelamis
		8850030105	Euthynnus quadripunctatus
8850030200	Sarda	8850030202	Sarda sarda
8850030300	Scomber	8850030301	Scomber colias
		8850030302	Scomber scombrus
8850030400	Thunnus	8850030401	Thunnus alalunga
		8850030402	Thunnus thynnus
		8850030403	Thunnus albacares
		8850030404	Thunnus obesus
8850030700	Auxis	8850030701	Auxis rochei
		8850030702	Auxis thazard
8850031200	Orcynopsis	8850031201	Orcynopsis unicolor
8850040000	Xiphiidae		

8850040100	Xiphias	8850040101	Xiphias gladius
8850050000	Luvaridae		
8850050100	Luvarus	8850050101	Luvarus imperialis
8850060000	Istiophoridae		
8850060100	Istiophorus	8850060101	Istiophorus platypterus
8850060300	Tetrapterus	8850060301	Tetrapterus albidus
8851010000	Centrolophidae		
8851010300	Centrolophus	8851010301	Centrolophus niger
8851020000	Nomeidae		
8851020200	Cubiceps	8851020203	Cubiceps gracilis
8851030000	Stromateidae		
8851030200	Hyperoglyphe	8851030201	Hyperoglyphe perciforma
8851030400	Schedophilus	8851030401	Schedophilus medusophagus
8857030000	Bothidae		
8857030400	Scophthalmus	8857030402	Scophthalmus maximus
		8857030403	Scophthalmus rhombus
8857031700	Arnoglossus	8857031702	Arnoglossus laterna
		8857031703	Arnoglossus imperialis
		8857031706	Arnoglossus thori
8857032100	Zeugopterus	8857032101	Zeugopterus punctatus
8857032200	Phrynorhombus	8857032201	Phrynorhombus norvegicus
		8857032202	Phrynorhombus regius
8857032300	Lepidorhombus	8857032301	Lepidorhombus boscii
		8857032302	Lepidorhombus whiffiagonis
8857040000	Pleuronectidae		
8857040500	Glyptocephalus	8857040502	Glyptocephalus cynoglossus
8857040600	Hippoglossoides	8857040603	Hippoglossoides platessoides
8857040900	Limanda	8857040904	Limanda limanda
8857041200	Microstomus	8857041202	Microstomus kitt
8857041400	Platichthys	8857041402	Platichthys flesus
8857041500	Pleuronectes	8857041502	Pleuronectes platessa
8857041800	Reinhardtius	8857041801	Reinhardtius hippoglossoides
8857041900	Hippoglossus	8857041902	Hippoglossus hippoglossus
8858010000	Soleidae		
8858010600	Solea	8858010601	Solea solea
		8858010610	Solea lascaris
8858010800	Buglossidium	8858010801	Buglossidium luteum
8858010900	Microchirus	8858010902	Microchirus azevia
		8858010903	Microchirus variegatus
8858011000	Bathysolea	8858011001	Bathysolea profundicola
8858011100	Dicologlossa	8858011101	Dicologlossa cuneata
8858020000	Cynoglossidae		
8858020200	Cynoglossus	8858020201	Cynoglossus browni
8860020000	Balistidae		
8860020200	Balistes	8860020205	Balistes carolinensis
8860020500	Canthidermis	8860020501	Canthidermis maculatus
8861010000	Tetradontidae		
8861010100	Lagocephalus	8861010102	Lagocephalus lagocephalus
8861040000	Molidae		
8861040100	Mola	8861040101	Mola mola
8861040200	Ranzania	8861040201	Ranzania laevis

APPENDIX VIII – SPECIES VALIDITY CODE

0 =	INVALID INFORMATION	Information lost. A note should be given with the cause for the classification as invalid.
1 =	VALID INFORMATION	No per hour and total length composition recorded; applies also when No per hour is zero.
4 =	TOTAL NO PER HOUR ONLY	Catch sampled for No per hour only; no length measurements.
9 =	VALID INFORMATION AVAIL-ABLE BUT NOT RECORDED ON THE FILE	Data no processed on the file

APPENDIX IX – SUB/DIVISIONS AND RECTANGLE CODES



APPENDIX X – MAX. LENGTH OF FISH SPECIES IN THE BITS CHECKING PROGRAM

NODC code	Latin name	English name	MAX LENGTH (CM)
	Clupeiformes		120
8747010201	*Clupea harengus*	Herring	040
8747011701	*sprattus sprattus*	Sprat	018
8747010100	*Alosa fallax*	Shad	050
8747020104	*Engraulis encrasicolus*	european anchovy	020
8755010306	*Salmo trutta*	sea trout	095
8755010302	*Salmo gairdneri*	rainbow trout	050
8755010115	*Coregonus lavaretus*	Whitefish	065
8755030301	*Osmerus eperlanus*	Smelt	029
8758010101	*Esox lucius*	Pike	120
8791030000	*Gadiformes*		120
8791030402	*Gadus morrhua*	Cod	135
8791031801	*Enchelyopus cimbrius*	four-bearded rockling	035
8791031801	*Merlangius merlangus*	Whiting	060
8857040000	*Pleuronectiformes*		060
8857041402	*Platichthys flesus*	Flounder	052
8857041502	*Pleuronectes platessa*	Plaice	057
8857040904	*Limanda limanda*	common dab	040
8857030402	*Scophthalmus maximus*	Turbot	060
	Perciformes		085
8835200403	*Stizostedion lucioperca*	Pikeperch	085
8835200202	*Perca fluviatilis*	Perch	040
8835200601	*Gymnocephalus cernua*	Ruff	015
8842130209	*Pholis gunnellus*	Butterfish	020
8842120905	*Lumpenus Lampretaeformis*	serpent blenny	035
8793012001	*Zoarces viviparus*	eel pout	040
8845010105	*Ammodytes tobianus*	sand eel	020
8845010301	*Hyperoplus lanceolatus*	greater sand eel	035
8850030302	*Scomber scombrus*	Mackerel	065
8835280103	*Trachurus Trachurus*	horse mackerel	045
8847010000	*Gobiidae*	Gobies	007
8847017505	*Neogobius melanostomus*	round goby	025
8831022207	*Myoxocephalus scorpius*	sea scorpion	035
8831080803	*Agonus cataphractus*	Pogge	020
8831091501	*Cyclopterus lumpus*	Lumpfish	045
8831090828	*Liparis liparis*	sea snail	010
8818010000	*Gasterosteiformes*		007
8818010101	*Gasterosteus aculeatus*	Stickleback	007
8776010000	*Cypriniformes*		060
8776014901	*Abramis brama*	Bream	060
8776010601	*Vimba vimba*	Vimba	040
8776017401	*Rutilus rutilus*	Roach	030
8741010000	*Anguilliformes*		180
8741010102	*Anguilla anguilla*	Eel	180
8603010000	*Petromyzoniformes*		090
8603010300	*Petromyzon sp.*	Lampreys	090

APPENDIX XI – ASSIGNMENT OF THE QUARTERS OF SQUARES TO THE ICES SUBDIVISIONS

				10°00				12°00				14°00				16°00				18°00				20°00					
		F9	F9	G0	G0	G1	G1	G2	G2	G3	G3	G4	G4	G5	G5	G6	G6	G7	G7	G8	G8	G9	G9	H0	H0	H1	H1	H2	H2
	50																												
60°30	50																												
	49																			29	29	29	29	29	29	29	29	29	29
60°00	49																			29	29	29	29	29	29	29	29	29	29
	48																					29	29	29	29	29	29	29	29
59°30	48																				29	29	29	29	29	29	29	29	29
	47																			27	27	29	29	29	29	29	29	29	29
59°00	47																			27	27	29	29	29	29	29	29	29	29
	46																	27	27	27	27	29	29	29	29	29	29	29	29
58°30	46															27	27	27	27	27	27	29	29	29	29	29	29	29	29
	45															27	27	27	27	27	27	28	28	28	28	28	28		
58°00	45																27	27	27	27	27	28	28	28	28	28	28		
	44					21	21									27	27	27	27	27	27	28	28	28	28	28	28		
57°30	44				21	21	21										27	27	27	27	28	28	28	28	28	28	28		
	43				21	21	21	21								27	27	27	27	27	28	28	28	28	28	28	28		
57°00	43			21	21	21	21	21								27	27	27	27	27	28	28	28	28	28	28			
	42			21	21	21	21	21	21							27	27	27	27	28	28	28	28	28	28	28			
56°30	42			21	21	21	21	21	21							27	27	27	27	28	28	28	28	28	28	28			
	41				21	21	21	21	21							25	25	25	25	26	26	26	26	26	26				
56°00	41			22	22	21	21	23	23			25	25	25	25	25	25	25	25	26	26	26	26	26	26	26			
	40			22	22	22	22	23	23			25	25	25	25	25	25	25	25	26	26	26	26	26	26	26			
55°30	40		22	22	22	22		23	23			25	25	25	25	25	25	25	25	26	26	26	26	26	26	26			
	39		22		22	22		23	23	24	24	24	25	25	25	25	25	25	25	26	26	26	26	26	26	26			
55°00	39		22	22	22	22	22	24	24	24	24	24	24	25	25	25	25	25	25	26	26	26	26	26	26				
	38		22	22	22	22	22	24	24	24	24	24	24	25	25	25	25	25	25	26	26	26	26	26					
54°30	38		22	22	22	22	22	24	24	24	24	24	24	25	25	25	25	25		26	26	26	26	26	26				
	37			22	22	22	22	24	24	24	24	24	24	25	25	25					26	26	26						
54°00	37				22	22	22	24		24	24	24	24	25	25														
	36				22																								
	36																												
		F9	F9	G0	G0	G1	G1	G2	G2	G3	G3	G4	G4	G5	G5	G6	G6	G7	G7	G8	G8	G9	G9	H0	H0	H1	H1	H2	H2

APPENDIX XII

Areas per 10 m depth range by square.

Strata	**SD 21**	44G0	44G1	43G0	43G1	43G2	42G0	42G1	42G2	41G0	41G1	39G0
Depth interval												
total	**6123.3**	**233.7**	**612.6**	**507.4**	**926.1**	**143.9**	**662.3**	**980.3**	**647.0**	**62.2**	**993.3**	**354.4**
0 - 9	**1166.6**	12.8	79.0	278.0	214.2	35.7	355.3	92.1	37.3	13.3	31.1	17.8
10 - 19	**1677.5**	39.5	44.8	143.9	121.2	37.9	307.0	438.6	154.6	41.1	298.9	50.0
20 - 29	**1419.5**	100.3	12.8	46.5	77.9	27.0	0.0	182.0	198.5	7.8	575.6	191.1
30 - 39	**846.8**	75.8	81.1	31.4	109.3	15.1	0.0	196.3	162.3	0.0	83.3	92.2
40 - 49	**467.7**	5.3	120.6	7.6	168.8	16.2	0.0	58.1	83.3	0.0	4.4	3.3
50 - 59	**255.1**	0.0	106.7	0.0	123.3	11.9	0.0	3.3	9.9	0.0	0.0	0.0
60 - 69	**100.1**	0.0	43.8	0.0	50.8	0.0	0.0	4.4	1.1	0.0	0.0	0.0
70 - 79	**79.4**	0.0	47.0	0.0	30.3	0.0	0.0	2.2	0.0	0.0	0.0	0.0
80 - 89	**46.1**	0.0	28.8	0.0	16.2	0.0	0.0	1.1	0.0	0.0	0.0	0.0
90 - 99	**32.1**	0.0	23.5	0.0	7.6	0.0	0.0	1.1	0.0	0.0	0.0	0.0
100 - 150	**32.1**	0.0	24.5	0.0	6.5	0.0	0.0	1.1	0.0	0.0	0.0	0.0
> 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

strata	**SD 22**	41G0	40F9	40G0	40G1	39F9	39G0	39G1	38F9	38G0	38G1	37G0	37G1	36G0

Depth interval														
total	**5162.8**	**186.7**	**90.0**	**790.1**	**282.5**	**263.3**	**338.6**	**412.7**	**90.0**	**928.1**	**528.7**	**278.1**	**820.2**	**153**
0 - 9	**1489.5**	32.2	21.4	238.6	117.1	83.2	99.2	161.9	27.7	166.2	334.8	72.4	99.3	35
10 - 19	**2132.9**	55.6	67.5	327.5	159.8	91.2	142.5	206.3	30.0	417.9	105.0	171.8	243.0	114
20 - 29	**1436.9**	94.4	1.1	184.6	4.5	84.4	90.1	31.9	32.3	312.8	85.4	33.9	477.9	3
30 - 39	**92.3**	3.3	0.0	32.6	1.1	4.6	6.8	9.1	0.0	31.2	3.5	0.0	0.0	0
40 - 49	**10.1**	1.1	0.0	6.8	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0
50 - 59	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
60 - 69	**1.1**	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0
70 - 79	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
80 - 89	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
90 - 99	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
100 - 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
> 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0

strata	**SD 23**	41g2	40g2	39g2
Depth interval				
total	**896.5**	**186.7**	**384.9**	**324.9**
0 - 9	**319.2**	32.2	200.3	86.6
10 - 19	**403.4**	55.6	165.5	182.4
20 - 29	**166.1**	94.4	15.8	55.9
30 - 39	**6.7**	3.3	3.4	0.0
40 - 49	**1.1**	1.1	0.0	0.0
50 - 59	**0.0**	0.0	0.0	0.0
60 - 69	**0.0**	0.0	0.0	0.0
70 - 79	**0.0**	0.0	0.0	0.0
80 - 89	**0.0**	0.0	0.0	0.0
90 - 99	**0.0**	0.0	0.0	0.0
100 - 150	**0.0**	0.0	0.0	0.0
> 150	**0.0**	0.0	0.0	0.0

strata	**SD 24**	39G2	39G3	39G4	38G2	38G3	38G4	37G2	37G3	37G4
Depth interval										
total	**6509.3**	**430.9**	**819.7**	**598.5**	**948.9**	**939.6**	**1038.9**	**266.4**	**461.5**	**1004.9**
0 - 9	**785.4**	88.9	31.9	21.7	85.4	78.5	2.3	92.3	271.1	113.3
10 - 19	**2461.5**	205.2	76.4	83.2	557.5	99.3	255.1	136.7	182.3	865.8
20 - 29	**1091.3**	127.7	114.0	63.8	252.8	170.8	292.0	37.4	8.2	24.5
30 - 39	**621.4**	9.1	176.7	65.0	49.6	152.4	167.4	0.0	0.0	1.2
40 - 49	**1396.6**	0.0	420.7	328.3	3.5	438.6	205.5	0.0	0.0	0.0
50 - 59	**124.3**	0.0	0.0	28.5	0.0	0.0	95.8	0.0	0.0	0.0
60 - 69	**28.8**	0.0	0.0	8.0	0.0	0.0	20.8	0.0	0.0	0.0
70 - 79	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80 - 89	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90 - 99	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100 - 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

strata	**SD 25**	41G4	41G5	41G6	41G7	40G4	40G5	40G6	40G7	39G4	39G5	39G6	39G7	38G5
Depth interval														
total	**12615.9**	**113.3**	**307.8**	**876.7**	**1000.0**	**747.4**	**1013.0**	**1013.0**	**1013.0**	**249.7**	**986.1**	**1026.0**	**1026.0**	**1038**
0 - 9	**332.5**	41.1	88.9	88.9	0.0	39.4	1.1	0.0	0.0	2.3	4.6	0.0	0.0	1
10 - 19	**1110.7**	21.1	57.8	132.2	26.7	122.7	7.9	0.0	63.0	2.3	4.6	8.0	0.0	3
20 - 29	**1324.6**	20.0	61.1	101.1	140.0	135.1	11.3	0.0	115.9	11.4	6.8	51.3	0.0	4
30 - 39	**2096.5**	31.1	82.2	250.0	358.9	86.7	88.9	185.7	318.5	10.3	9.1	67.3	78.7	33
40 - 49	**1749.4**	0.0	17.8	128.9	231.1	162.1	221.7	261.1	118.2	36.5	18.2	78.7	183.5	86
50 - 59	**1504.4**	0.0	0.0	96.7	184.4	70.9	139.6	174.5	129.4	47.9	34.2	109.4	189.2	249
60 - 69	**1531.6**	0.0	0.0	72.2	57.8	46.1	180.1	171.1	243.1	53.6	49.0	199.5	119.7	322
70 - 79	**1505.4**	0.0	0.0	6.7	1.1	75.4	228.5	197.0	24.8	73.0	169.9	249.7	239.4	223
80 - 89	**797.5**	0.0	0.0	0.0	0.0	9.0	115.9	23.6	0.0	12.5	212.0	158.5	151.6	114
90 - 99	**638.2**	0.0	0.0	0.0	0.0	0.0	18.0	0.0	0.0	0.0	457.1	103.7	59.3	0
100 - 150	**25.1**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.5	0.0	4.6	0
> 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0

strata	**SD 26**	41G8	41G9	41H0	41H1	40G8	40G9	40H0	40H1	39G8	39G9	39H0	39H1	38G
Depth interval														
total	**10967.1**	**1000.0**	**1000.0**	**982.2**	**15.6**	**1013.0**	**1013.0**	**1013.0**	**69.8**	**1026.0**	**1026.0**	**877.8**	**11.4**	**69**
0 - 9	**218.0**	0.0	0.0	37.8	8.9	0.0	0.0	4.5	28.1	0.0	0.0	11.4	4.6	6
10 - 19	**475.3**	2.2	0.0	123.3	6.7	0.0	0.0	28.1	14.6	0.0	0.0	46.7	4.6	11
20 - 29	**713.9**	85.6	0.0	157.8	0.0	0.0	0.0	48.4	27.0	4.6	0.0	177.8	2.3	12
30 - 39	**1189.8**	142.2	0.0	355.6	0.0	0.0	0.0	208.2	0.0	25.1	2.3	274.7	0.0	7
40 - 49	**674.0**	78.9	7.8	81.1	0.0	0.0	0.0	203.7	0.0	17.1	9.1	177.8	0.0	3
50 - 59	**844.5**	72.2	95.6	101.1	0.0	39.4	65.3	206.0	0.0	36.5	17.1	101.5	0.0	3
60 - 69	**966.4**	32.2	137.8	58.9	0.0	85.5	182.3	141.8	0.0	69.5	76.4	66.1	0.0	4
70 - 79	**944.4**	47.8	63.3	36.7	0.0	68.7	194.7	100.2	0.0	148.2	102.6	17.1	0.0	3
80 - 89	**1488.2**	48.9	54.4	18.9	0.0	168.8	328.7	72.0	0.0	438.9	204.1	4.6	0.0	4
90 - 99	**1383.4**	104.4	61.1	10.0	0.0	210.5	192.5	0.0	0.0	283.9	336.3	0.0	0.0	7
100 - 150	**2069.2**	385.6	580.0	1.1	0.0	440.1	49.5	0.0	0.0	2.3	278.2	0.0	0.0	5
> 150	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

strata	SD 27	42G6	42G7	43G6	43G7	43G8	44G6	44G7	44G8	45G6	45G7	45G8	46G6	46G7
Depth interval														
total	**8826.6**	**427.7**	**986.9**	**389.5**	**945.6**	**189.3**	**331.9**	**960.5**	**435.4**	**194.7**	**947.2**	**947.2**	**78.2**	**598**
0 - 9	**1014.8**	150.2	0.0	108.2	26.0	66.0	121.7	0.0	8.5	117.9	28.4	0.0	36.5	121
10 - 19	**700.5**	111.8	0.0	60.6	45.4	53.0	61.9	1.1	10.7	42.1	36.8	0.0	28.1	102
20 - 29	**525.3**	31.8	3.3	114.7	41.1	30.3	44.8	1.1	11.7	20.0	46.3	0.0	8.3	91
30 - 39	**415.7**	23.0	14.3	70.3	47.6	38.9	27.7	3.2	8.5	10.5	33.7	1.1	4.2	74
40 - 49	**538.2**	23.0	24.1	32.5	92.0	1.1	55.5	24.5	18.1	4.2	92.6	13.7	1.0	75
50 - 59	**562.5**	25.2	205.1	3.2	76.8	0.0	17.1	45.9	9.6	0.0	52.6	13.7	0.0	51
60 - 69	**463.9**	23.0	168.9	0.0	66.0	0.0	3.2	39.5	10.7	0.0	52.6	11.6	0.0	26
70 - 79	**532.3**	38.4	190.8	0.0	100.6	0.0	0.0	50.2	23.5	0.0	57.9	23.2	0.0	14
80 - 89	**634.0**	1.1	201.8	0.0	110.4	0.0	0.0	64.0	54.4	0.0	91.6	42.1	0.0	19
90 - 99	**961.6**	0.0	154.6	0.0	145.0	0.0	0.0	233.7	124.9	0.0	90.5	144.2	0.0	15
100 - 150	**1782.0**	0.0	24.1	0.0	194.7	0.0	0.0	399.1	154.7	0.0	280.0	521.0	0.0	6
> 150	**695.8**	0.0	0.0	0.0	0.0	0.0	0.0	98.2	0.0	0.0	84.2	176.8	0.0	0

strata	SD 28	42G8	42G9	42H0	42H1	43G8	43G9	43H0	43H1	44G8	44G9	44H0	44H1	45G9
Depth interval														
total	**11398.4**	**963.9**	**986.9**	**982.5**	**75.7**	**347.3**	**973.7**	**973.7**	**434.9**	**100.3**	**923.1**	**960.5**	**887.9**	**937**
0 - 9	**353.5**	9.9	0.0	18.6	28.5	41.1	1.1	0.0	38.9	13.9	34.2	0.0	72.6	16
10 - 19	**733.7**	62.5	0.0	66.9	30.7	56.3	2.2	5.4	117.9	22.4	44.8	4.3	180.4	28
20 - 29	**974.3**	239.0	0.0	84.4	16.4	59.5	10.8	40.0	114.7	39.5	30.9	4.3	151.5	25
30 - 39	**881.0**	227.0	0.0	102.0	0.0	56.3	18.4	64.9	49.8	24.5	63.0	2.1	112.1	31
40 - 49	**772.7**	117.3	0.0	89.9	0.0	35.7	19.5	97.4	26.0	0.0	60.8	25.6	112.1	62
50 - 59	**825.2**	68.0	0.0	112.9	0.0	33.5	30.3	94.1	28.1	0.0	65.1	37.4	149.4	46
60 - 69	**621.4**	23.0	0.0	73.5	0.0	17.3	40.0	51.9	54.1	0.0	57.6	55.5	76.8	51
70 - 79	**479.7**	48.2	0.0	65.8	0.0	11.9	44.4	49.8	5.4	0.0	53.4	52.3	14.9	53
80 - 89	**614.3**	36.2	0.0	38.4	0.0	8.7	59.5	82.2	0.0	0.0	73.6	60.8	13.9	58
90 - 99	**774.5**	37.3	0.0	37.3	0.0	8.7	71.4	73.6	0.0	0.0	105.7	122.7	4.3	89
100 - 150	**2935.0**	95.4	540.6	219.3	0.0	18.4	440.3	135.2	0.0	0.0	265.7	470.6	0.0	301
> 150	**1433.1**	0.0	446.3	73.5	0.0	0.0	235.9	279.1	0.0	0.0	68.3	124.9	0.0	172

ANNEX 3

MANUAL FOR THE BALTIC INTERNATIONAL ACOUSTIC SURVEY (BIAS)

VERSION 0.72

07.04.2000

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Section **Page**

1 INTRODUCTION

Hydroacoustic surveys have been conducted in the Baltic Sea internationally since 1978. The starting point was the cooperation between Sweden and the German Democratic Republic in October 1978, which produced the first acoustic estimates of total biomass of herring and sprat in the Baltic Main basin (Håkansson *et al,.* 1979). Since then there has been at least one annual hydroacoustic survey for herring and sprat stocks mainly for assessment purposes and results have been reported to ICES to be used for stock assessment (ICES. 1994a, 1995a, 1995b, Hagström *et al.*, 1991).

At the ICES Annual Science Conference in September 1997, the Baltic Fish Committee decided, that a manual for the International Acoustic Trawl Surveys in the Baltic area should be elaborated. The structure of the manual follows that of the Baltic International Trawl Surveys (BITS). In order to obtain a standardization for all ICES acoustic surveys some demands from the Manual for Herring Acoustic Surveys in ICES Divisions III, IV and VI (ICES, 1994b) are adopted.

The objective of the Baltic International Acoustic Surveys (BIAS) program is to standardize survey design, acoustic measurements, fishing method and data analysis throughout all national surveys where data are used as indices for assessment purposes.

1 SURVEY DESIGN

1.1 AREA OF OBSERVATION

The acoustic surveys should cover the total area of ICES Division III. The border by subdivision is given in Figure 2.1 and Table 2.1. The area is limited by the 10 m depth line.

1.2 STRATIFICATION

The stratification is based on ICES statistical rectangles with a range of 0.5 degrees in latitude and 1 degree in longitude.
The areas of all strata limited by the 10 m depth line are given in Table 2.2

1.3 TRANSECTS

Parallel transects are spaced on regular rectangle basis at a maximum distance of 15 nautical miles.
The transect density should be about 60 nm per 1000 nm².
In the vicinity of islands and in sounds the strategy of parallel transects leads to an unsuitable coverage of the survey area. In this case a zig-zag course should be used to achieve a regular covering. The length of the survey track should be chosen proportional to the parallel case.

1.4 OBSERVATION TIME

The International Acoustic Survey is carried out in September/October. It is assumed that during this time of the year there is little or no emigration or immigration in the main part of the Baltic Sea so that the estimates are representing a good ‘snapshot’ of the herring and sprat resources.
In the shallow water areas of the Western Baltic a great part of the fish concentrations are close to the bottom during daytime and therefore not visible for the echosounder. This leads to an underestimation of fish. Therefore the survey should be carried out only during nighttime.

2 ACOUSTIC MEASUREMENTS

2.1 EQUIPMENT

The standard equipment used for the survey are the echosounder SIMRAD EK/EY-500 or SIMRAD EK-400.
The standard frequency used for the survey is 38 kHz.

2.2 INSTRUMENT SETTINGS

Some instrument settings will influence the acoustic measurements to a high degree. Particularly the following calibration settings in the ***Transceiver Menu*** are essential for the correct function of the acoustic device:

- Max. Power
- 2-Way Beam Angle
- Sv Transd. Gain
- TS Transd. Gain

Additional in the split-beam case:

- Angle Sens.Along
- Angle Sens.Athw.

3dB Beamw.Along
3dB Beamw.Athw.
Alongship Offset
Athw.ship Offset

The following settings are recommended:

Pulse rate	1 sec.
Absorption coef.	3 dBkm
Pulse Length	Medium
Bandwidth	Wide

and in the ***Layer Menu***:

Threshold	-60 dB
Bottom margin	0.5 m

It is recommended to record this settings regularly to have a log about the main function of the acoustic measuring system.
It is also recommended that each year the same settings (Min Sv = -60dB) are used for the printer in order to facilitate comparison of echograms.

2.3 SAMPLING UNIT

The Elementary Sampling Distance Unit (ESDU) is the length of cruise track, where acoustic measurements are averaged to give one sample. It is recommended to use as averaging unit 1 nautical mile.

2.4 CALIBRATION

A calibration of the transducer must be conducted at least once during the survey. If possible, the transducer should be calibrated both at the beginning and the end of the survey. Calibration procedures are described in appendix 2.

2.5 INTERCALIBRATION

When more than one ship is engaged in the same area the performance of the equipment should be compared by means of an intercalibration. Preferably the vessels should start and finish the intercalibration with fisheries hauls. A survey track should be chosen in areas with high density scattering layers. The settings of the acoustic equipment should be kept constant during the whole survey.

During the intercalibration one leading vessel should steam 0.5 nautical miles ahead of the other. The lateral distance between the survey tracks should be 0.3 nautical miles. The intercalibration track should be at least 40 nautical miles. It is stressed that the vessels have to change their position at least once during the operation.

3 FISHERY

3.1 GEAR

Trawling is done with different pelagic gear in the midwater as well as in the near bottom. The collection of the trawl gears used in surveys is given in Table 4.1.

The stretched mesh size in the codend of the trawl should be 20 mm.

3.2 METHOD

The collection of biological samples is done to determine the species composition and length, age and weight distributions of target species detected by the echosounder system.

It is recommended to sample a minimum of 2 hauls per stratum.

Standard fishing speed is 3 - 4.5 knots.

Each haul is recommended to last for 30 minutes.

It has to be secured that all type of fish concentration is sampled for species recognition. In situations with fish vertically distributed over the whole water column, specifically in shallow waters, the whole depth range should be sampled by the trawl haul. With two or more fish layers in an area (Fig. 4.2.1), all layers should be sampled by separate trawl hauls. If shoals and scattering layers are present (Fig. 4.2.2), both should be sampled by separate trawl hauls.

3.3 SAMPLES

3.3.1 Species composition

It should be achieved to sort the total catch into **all species** (Table 4.3.1). The corresponding weight per species should be registered.

In case of homogenous large catches of clupeoids a subsample of at least 50 kg should be taken and sorted for the identification of the species. The weight of the subsample, and the total weight per species in the subsample should be registered.

In case of heterogeneous large catches consisting of a mixture of clupeoids and few larger species the total catch should be partitioned into the part of larger species and that of the mixture of clupeoids. From the mixture of clupeoids a subsample of at least 50 kg should be taken. The total weight per species for the part of the larger species and the total weight of the subsample of mixed clupeoids should be registered.

Certain related species that are hard to identify down to species level may be grouped by genus levels or larger taxonomic units.

3.3.2 Length distribution

Length distributions are recorded for all fish species caught. Length is defined as total length (measured from tip of snout to tip of caudal fin). Length is measured to 0.5 cm below for herring and sprat, and to 1 cm below for all other species.

In case of large catches of clupeoids with a small length spectrum, a sub-sample should be taken containing at least 200 specimens per species to get a reasonable normal length distribution. For other species at least 50 specimens should be measured.

In case of large herring catches with a wide length spectrum, the subsamples should contain at least 400 specimens.

3.3.3 Weight distribution

Taking into account the available manpower two methods are possible:

Maximum effort method. The mean weight per length group for herring and sprat is to be measured for each trawl haul**.**

Minimum effort method. The mean weight per length group for herring and sprat is to be measured for each ICES Sub-division**.** It is recommended to cover the whole Sub-division homogeneously.

The maximum effort method should be preferred.

Herring and sprat should be sorted into 0.5 cm length groups and weighted.

3.3.4 Age distribution

Taking into account the available manpower two methods are possible:

Maximum effort method: The otolith samples are collected for herring and sprat per each trawl haul**.**

Minimum effort method: The otolith samples are collected for herring and sprat per each ICES Sub-division**.** It is recommended to cover the whole Sub-division homogeneously.

The maximum effort method should be preferred.

If otolith samples are to be taken of the 2 target species herring and sprat the number of otoliths per length-class are not fixed by a constant figure. The following minimum sampling levels should be maintained for herring and sprat per Sub-division:

- 5 otoliths per 0.5 cm length-class for l<10cm
- 10 otoliths per 0.5 cm length-class for l>=10cm.

For the smallest size groups, that presumably contain only one age group, the number of otoliths per length class may be reduced.

3.4 ENVIRONMENTAL DATA

Temperature and salinity should be taken by a CTD probe after each haul, and recorded at least in 1 m intervals.

4 DATA ANALYSIS

4.1 SPECIES COMPOSITION

Trawl catches within each stratum are combined to give an average species composition of the catch. Each trawl catch is given equal weight, unless it is decided that a trawl catch is not representative for the fish concentrations sampled. In this case, the particular trawl catch is not used. The species frequency f_i of species i can be estimated by

$$f_i = \frac{1}{M}\sum_{k=1}^{M}\frac{n_{ik}}{N_k} \qquad (5.1)$$

where n_{ik} the fish number of species i in the trawl k and N_k the total fish number in this haul.

A species can be excluded if the percentage is lower than one percent.

4.2 LENGTH DISTRIBUTION

It is assumed that catch rates are poorly related to abundance. In this case each trawl catch is given equal weight. Very small samples are considered as non representative and excluded from the calculation. We find the length frequency f_{ij} in the length class j as the mean over all M_i trawl catches containing the species i

$$f_{ij} = \frac{1}{M_i} \sum_{k=1}^{M_i} \frac{n_{ijk}}{N_{ik}} \qquad (5.2)$$

where n_{ijk} the number of fish within the length class j and N_{ik} the total number of species i in the haul k.

4.3 AGE DISTRIBUTION

Minimum effort method: All sampled otoliths within each Sub-division are assumed to be representative for the species age distribution within this area. The age-length-key in this Sub-division can be expressed as frequencies f_{aj} or as relative quantities (fractions) q_{aj} associated with age a in length class j. The combination of the age length key q_{aj} for the whole Sub-division with the length distribution f_j from a specific stratum results in the age distribution f_a for this stratum, i.e.

$$f_a = \sum_j q_{aj} \cdot f_j \qquad (5.3.1)$$

Maximum effort method: The age distribution for each rectangle is estimated as unweighted mean of all samples, i.e.

$$f_a = \frac{1}{M} \sum_k f_{ak} \qquad (5.3.2)$$

4.4 WEIGHT DISTRIBUTION

Minimum effort method: For the calculation of the weight distribution per age group W_a we use also the normalized age-length-key q_{aj} (see 5.3) and the mean weight per length group W_j.

$$W_a = \sum_j q_{aj} \cdot f_j \cdot W_j \qquad (5.4.1)$$

Maximum effort method: The weight distribution for each rectangle is estimated as unweighted mean of all samples.

$$w_a = \frac{1}{M} \sum_k w_{ak} \qquad (5.4.2)$$

4.5 LACK OF SAMPLE HAULS

In the case of lack of sample hauls within an individual ICES rectangle (due to small bottom depth, bad weather conditions or other limitations) a mean of all available neighbouring rectangles should be taken.

4.6 ALLOCATION OF RECORDS

During the survey herring and sprat normally cannot be distinguished from other species by visual inspection of the echogram. Both herring and sprat tend to be distributed in scattering layers or in pelagic layers of small schools, and it is not possible to ascribe values to typical herring schools.

Species allocation is then based entirely upon trawl catch composition. The estimates of total fish density are then allocated to species and age groups according to the trawl catch composition in the corresponding stratum.

4.7 TARGET STRENGTH OF AN INDIVIDUAL FISH

The mean cross section σ of an individual fish of species i should be derived from a function which describes the length-dependence of the target-strength.

$$TS = a_i + b_i \cdot \log L \qquad (5.7.1)$$

a_i and b_i are constants for the i'th species and L is the length of the individual fish in cm.

The equivalent formula for the cross-section is:

$$\sigma_{ij} = 4\pi \cdot 10^{a_i/10} \cdot L_j^{b_i/10} \qquad (5.7.2)$$

Normally we assume a quadratic relationship, that means b_i is 20. We get the simple formula:

$$\sigma_{ij} = d_i \cdot L_j^{\,2} \qquad (5.7.3)$$

The parameters a, b and d are listed in Table 5.7 for different species.

4.8 ESTIMATION OF THE MEAN CROSS SECTION IN THE STRATUM

The basis for the estimation of total fish density F from the measured area scattering cross section S_a is the conversion factor c.

$$F = S_a \cdot c = \frac{S_a}{<\sigma>} \qquad (5.8.1)$$

The mean cross section <?> in the stratum is dependent from the species composition and the length distributions of all species. From formula 5.7.3 we get the corresponding cross section <?$_i$>

$$<\sigma_i> = \sum_j f_{ij} \cdot d_i \cdot L_j^2 \qquad (5.8.2)$$

where L_j is the mid point of the j-th length class and f_{ij} the respective frequency.

It follows that the mean cross section in the stratum can be estimated as the weighted mean of all species related cross sections <?$_i$>:

$$<\sigma> = \sum f_i \sigma_i = \sum_i f_i \sum_j f_{ij} d_i L_j^2 \qquad (5.8.3)$$

4.9 ABUNDANCE ESTIMATION

The total number of fish in the stratum has to be estimated as:

$$N = F \cdot A = \frac{S_a}{<\sigma>} \cdot A \qquad (5.9.1)$$

This total abundance is split into species classes N_i by

$$N_i = N \cdot f_i \qquad (5.9.2)$$

especially in abundance of herring N_h and sprat $N_{s.}$

The abundance of the species i is divided into age-classes, $N_{a,j}$ according to the age distribution $f_{i,a}$ in each stratum

$$N_{ia} = N_i \cdot f_{ia} \qquad (5.9.3)$$

4.10 BIOMASS ESTIMATION

The biomass Q_{ia} for the species i and the age group a is calculated from the abundance N_{ia} and the mean weight per age group

$$Q_{ai} = N_{ai} \cdot W_a \qquad (5.10.1)$$

5 DATA EXCHANGE AND DATABASE

5.1 EXCHANGE OF SURVEY RESULTS

The main results of BIAS should be summarized and reported to the Acoustic Survey coordinator (F. Arrhenius, Sweden) not later than January of the next year. These results are intended for the information of the Assessment Groups and should contain the following documents :

- the map of the cruise track and the fishery stations
- a short description of the survey
- the table of the basic values for the abundance estimation (survey statistics)
- tables of the abundance of herring and sprat per age group
- tables of the mean weights of herring and sprat per age group

The standard exchange format for the documents is described in Table 6.1.

5.2 BAD1

The database BAD1 is the collection of results from the Baltic International Acoustic Surveys (BIAS). The sampling unit is the stratum (see 2.2). The contents of the database are similar to the standard data exchange format (6.1) for the BIAS. The database BAD1 consists of the following six tables:

- AH Abundance (in millions) of herring per age group
- AS Abundance (in millions) of sprat per age group
- ST Basic values for the computation of the abundance
- SU Description of the different surveys
- WH Mean weights of herring per age group

- WS Mean weights of sprat per age group

The inner structure of the tables is summarised in Table 6.2.

6 REFERENCES

ICES. 1994a. Report of the Planning Group for Hydroacoustic Surveys in the Baltic. ICES CM 1994/J:4. 18pp.

ICES 1994b. Report of the Planning Group for Herring Surveys. ICES CM 1994/H:3. 26pp.

ICES. 1995a. Report of the Study Group on Data Preparation for the Assessment of Demersal and Pelagic Stocks in the Baltic. ICES CM 1995/Assess:17. 104 pp.

ICES. 1995b. Report of the Study Group on Assessment-related Research-Activities relevant to the Baltic Fish Resources. ICES CM 1995/J:1. 59 pp.

Håkansson, N.; Kollberg, S.; Falk, U.; Götze, E., 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):7–23.

Hagström, O.; Palmen, L.-E., Hakansson, N.; Kästner, D.; Rothbart, H. Götze, E.; Grygiel, W.; Wyszynski, M. 1991. Acoustic estimates of the herring and sprat stocks in the Baltic proper October 1990. ICES CM 1991/J:34.

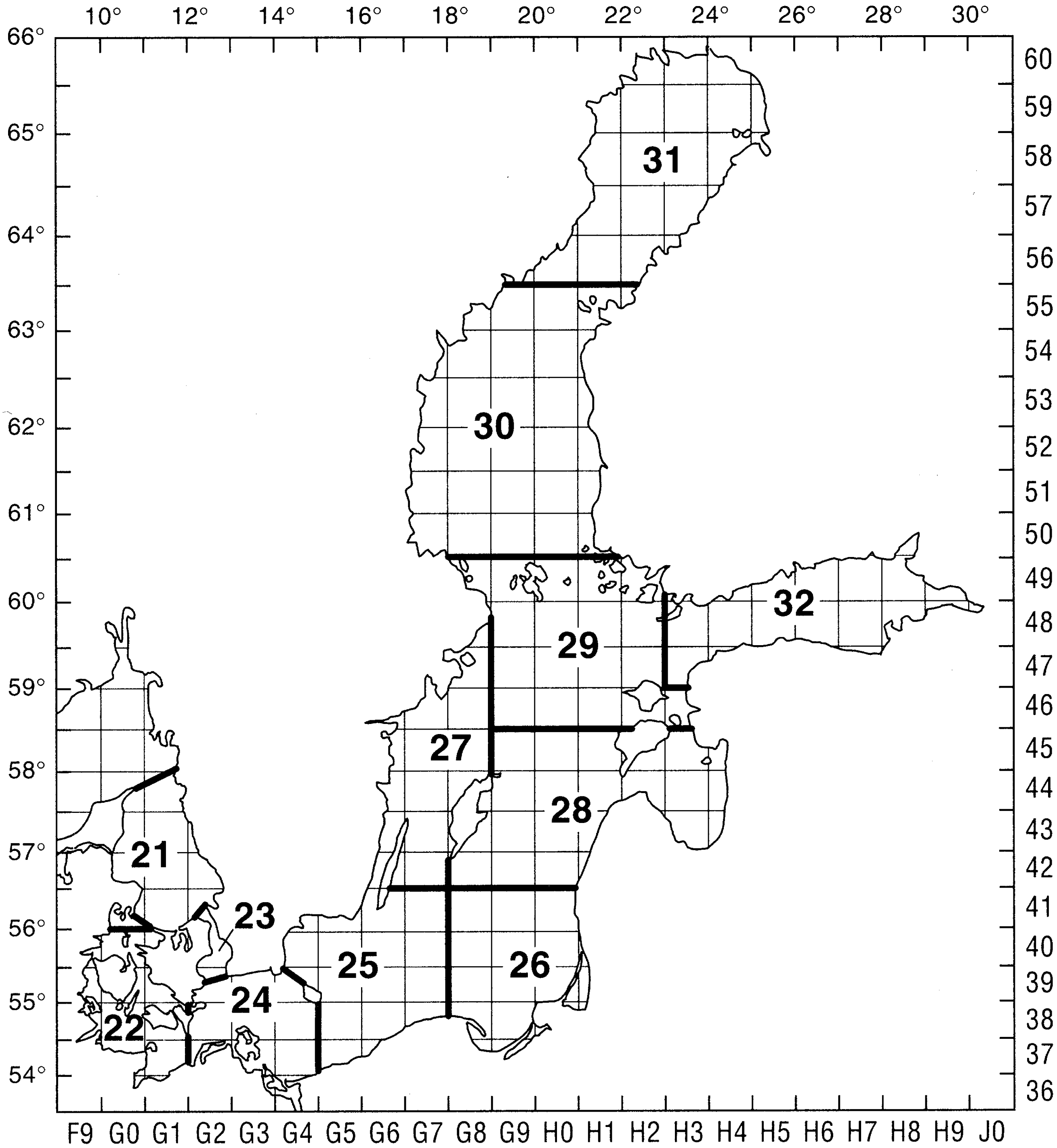


Figure 2.1. ICES Sub-division borders and rectangles codes.

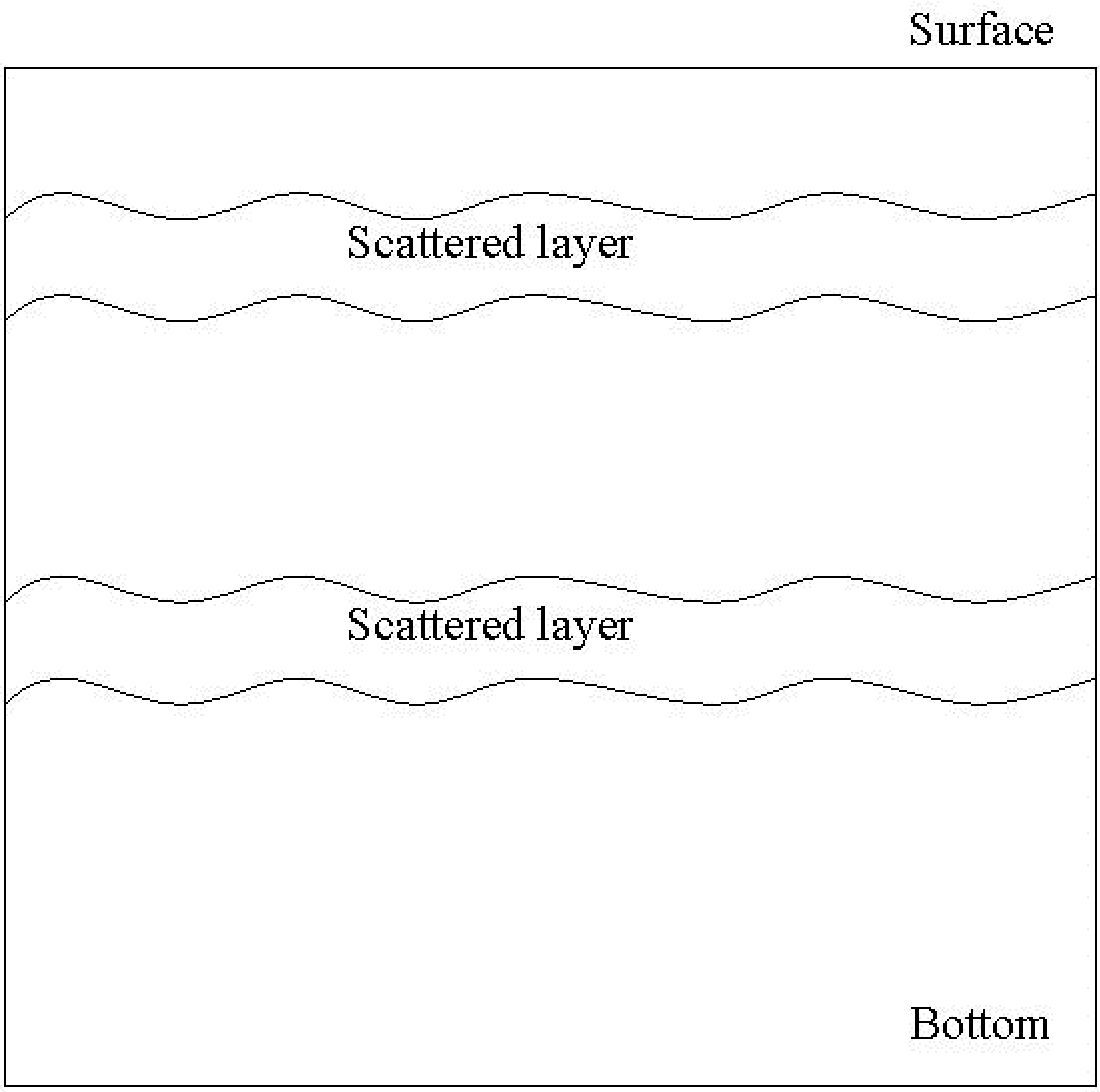


Figure 4.2.1. Multiple scattering fish layers.

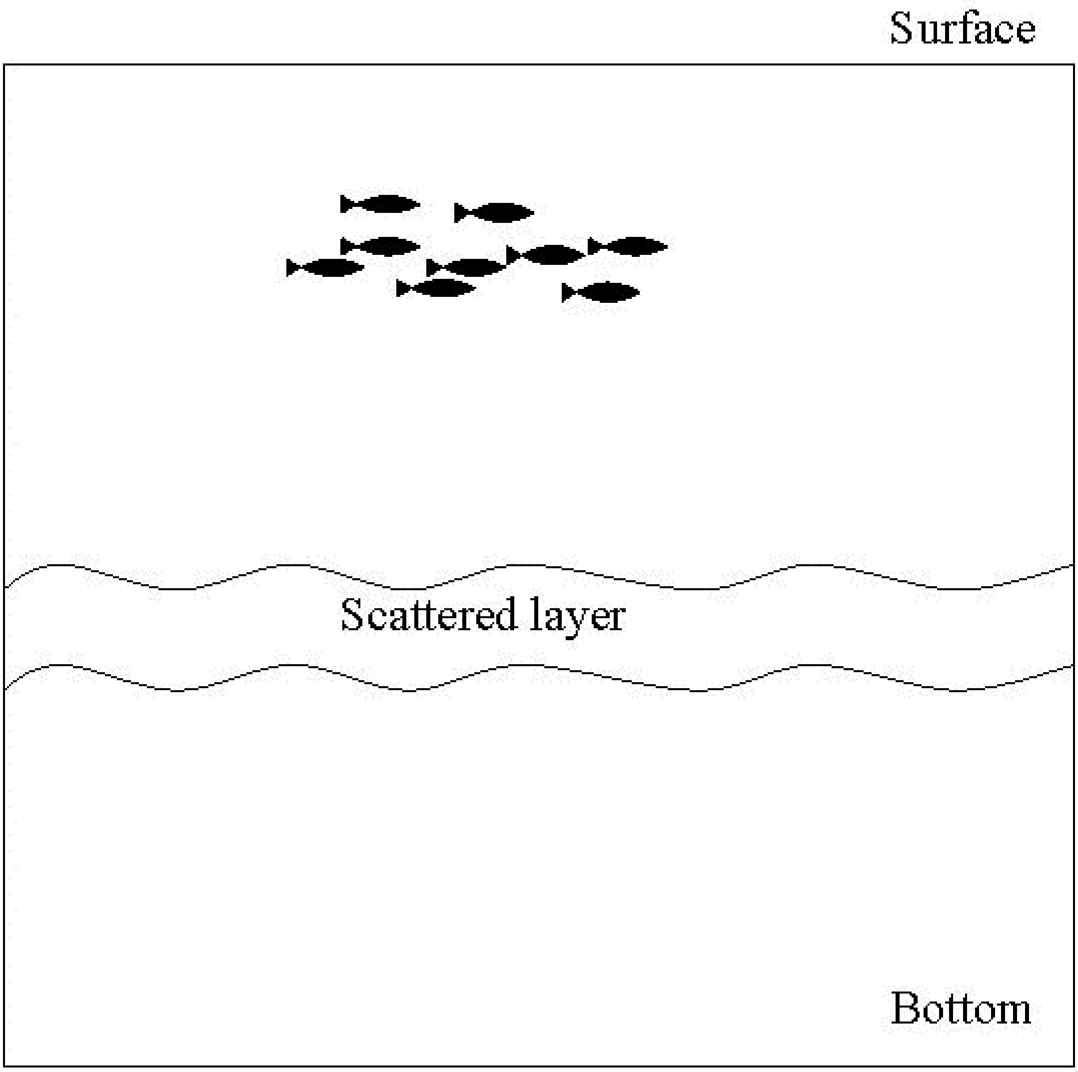


Figure 4.2.2. Shoals and scattering fish layers.

Table 2.1. The boundaries of the Sub-divisions of the Baltic Sea and the Belts.
(IBSFC Fishery Rules)

Sub-division 22

Northern boundary:	a line from Hasenore head to Gniben Point
Eastern boundary:	a line at longitude 12° East due South from Zealand to Falster, then along the East coast of the Island of Falster to Gedser Odde (54°34'N, 11°58'E), then due South to the coast of the Federal Republic of Germany.

Sub-division 23

Northern boundary:	a line from Gilbjerg Head to the Kullen.
Southern boundary:	a line from Falsterbo Light on the Swedish coast to Stevns Light on the Danish coast.

Sub-division 24

The western boundaries coincide with the eastern boundary of Sub-division 22 and the southern boundary of Sub-division 23. The eastern boundary runs along the line from Sandhammeren Light to Hammerode Light and south of Bornholm further along 15°E.

Sub-division 25

Northern boundary:	the latitude 56°30'N.
Eastern boundary:	the longitude 18°E.
Western boundary:	coincides with the eastern boundary of Sub-division 24

Sub-division 26

Northern boundary:	the latitude 56° 30'N.
Eastern boundary:	the longitude 18° E.

Sub-division 27

Eastern boundary:	the longitude 19° E from 59° 41'N to the Isle of Gotland and from the Isle of Gotland along 57° N to 18° E and further to the South along the longitude 18° E.
Western boundary:	the latitude 56°30'N.

Sub-division 28

Northern boundary:	the latitude 58° 30'N.
	the latitude 56° 30'N.
Western boundary:	north of Gotland, the latitude 19° E and south of Gotland along 57° N to the longitude 18° E, and further south along the longitude 18° E.

Sub-division 29

Northern boundary:	the latitude 60° 30'N.
Eastern boundary:	the longitude 23° E to 59° N and further along 59° N to the east Southern boundary: the latitude 58° 30'N.
Western boundary:	from 59° 41'N, along the longitude 19° E to the south.

Sub-division 30

Northern boundary:	the latitude 63° 30'N.
Southern boundary:	the latitude 60° 30'N.

Sub-division 31

Southern boundary:	the latitude 63° 30'N.

Sub-division 32

Western boundary:	coincides with the eastern boundary of Sub-division 29

Table 2.2. Area of strata (values of the areas of standard rectangles in nautical square miles below 10 m depth).

Estimated w ith a dataset from Seifert & Kayser (Seifert. T.; Kayser. B.: 1995. A high resolution spherical grid topography of the Baltic Sea. Meeresw iss. Berichte (Marine Science Reports) Inst. Ostseeforschung Warnemünde. Nr. 9. 1995. S. 72 - 88.).

SD21	41G0	41G1	41G2	42G1	42G2	43G1	43G2
	108.1	946.8	432.3	884.2	606.8	699.0	107.0

SD22	37G0	37G1	38F9	38G0	38G1	39F9	39G0	39G1	40F9	40G0	40G1	41G0	41G1
	209.9	723.3	51.9	735.3	173.2	159.3	201.7	250.0	51.3	538.1	174.5	173.1	18.0

SD23	39G2	40G2	41G2
	130.9	164.0	72.3

SD24	37G2	37G3	37G4	38G2	38G3	38G4	39G2	39G3	39G4
	192.4	167.7	875.1	832.9	865.7	1034.8	406.1	765.0	524.8

SD25	37G5	37G6	38G5	38G6	38G7	39G4	39G5	39G6	39G7	40G4	40G5	40G6	40G7	41G4	41G5	41G6	41G7
	642.2	130.7	1035.7	940.2	471.7	287.3	979.0	1026.0	1026.0	677.2	1012.9	1013.0	1013.0	59.4	190.2	764.4	1000.0

SD26	37G8	37G9	38G8	38G9	38H0	39G8	39G9	39H0	39H1	40G8	40G9	40H0	40H1	41G8	41G9	41H0	41H1
	86.0	151.6	624.6	918.2	37.8	1026.0	1026.0	881.6	12.8	1013.0	1013.0	1012.1	56.3	1000.0	1000.0	953.3	16.6

SD27	42G6	42G7	43G6	43G7	43G8	44G6	44G7	44G8	45G6	45G7	45G8	46G6	46G7	46G8	47G8	48G8
	266.0	986.9	269.8	913.8	106.1	200.9	960.5	456.6	72.9	908.7	947.2	38.9	452.6	884.8	264.3	53.8

SD28	42g8	42g9	42h0	42h1	43g8	43g9	43h0	43h1	43h3	43h4	44g8	44g9	44h0	44h1	44h2	44h3	44h4	45g9	45h0	45h1	45h2	45h3	45h4
	945.4	986.9	968.5	75.0	296.2	973.7	973.7	412.7	744.3	261.9	68.1	876.6	960.5	824.6	627.3	936.1	290.6	924.5	947.2	827.1	209.9	638.2	96.5

SD29	46g9	46h0	46h1	46h2	46h3	47g9	47h0	47h1	47h2	48g9	48h0	48h1	48h2	49g8	49g9	49h0	49h1	49h2
	933.8	933.8	921.5	258.0	13.2	876.2	920.3	920.3	793.9	772.8	730.3	544.0	597.0	196.0	564.2	85.3	65.2	28.4

SD30	50G7	50G8	50G9	50H0	50H1	51G7	51G8	51G9	51H0	51H1	52G7	52G8	52G9	52H0	52H1	53G7	53G8	59G9
	403.1	833.4	879.5	795.1	41.6	614.5	863.7	865.8	865.7	237.3	482.6	852.0	852.0	852.0	263.9	354.5	838.1	838.1

SD30	53H0	53H1	54G7	54G8	54G9	54H0	55G8	55G9	55H0	55H1
cont.	838.1	126.6	13.2	642.2	824.2	727.9	103.6	625.6	688.6	86.7

SD31	56G9	56H0	56H1	56H2	56H3	57H1	57H2	57H3	57H4	58H1	58H2	58H3	58H4	59H1	59H2	59H3	59H4	60H2	60H3	60H4
	8.1	269.2	789.7	414.3	13.2	558.1	782.0	518.9	9.0	486.0	767.8	766.1	256.6	105.8	603.1	752.5	409.0	49.2	181.2	58.0

SD32	47H3	47H4	47H7	48H3	48H4	48H5	48H6	48H7	48H8	49H4	49H5	49H6	49H7	49H8	49H9	50H8
	536.2	90.9	90.0	615.7	835.1	767.2	776.1	851.4	308.5	64.8	306.9	586.5	754.6	665.1	205.2	43.0

Table 4.1. Trawl gear specification.

A	B	C	D	E	F	G	H	J	K	L	M	N2/N3												O	P
Country	Vessel	Power	Code	Name	Type	Panels	Headl	Groundr	Sweeps	Length	Circum	Mesh size												Height	Spread
		kW			B/P	2/4	m	m	m	m	m	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	m	m
GFR	WAH3	2900	GOV	GOV	B	2	36.0	52.8	110.0	51.7	76.0	200	160	120	80	50								4	23
GFR	WAH3	2900	PS205	PSN205	P	4	50.4	55.4	99.5	84.3	205.0	400	200	160	80	50								12	28
GFR	WAH3	2900	1600#	1600# Engelnetz	P	4	70.0	78.0	69.5	118.5	315.0	200	100	50										19	36
GFR	SOL	588	BLACK	Blacksprutte 854#	P	4	39.2	39.2	105.0	60.4	156.0	8/200	4/200	200	160	120								11	22
GFR	SOL	588	PS388	Krake	P	4	42.0	42.0	63.5	59.8	142.4	400	200	80										9	21
GFR	SOL	588	H20	HG20/25	B	2	25.7	39.8	63.5	41.9	51.0	120	80	40										3	15
GFR	SOL	588	AAL	Aalhopser	B	2	31.0	29.7	63.5	57.5	119.0	160	120	80	40									6	19
GFR	SOL	588	KAB	Kabeljaubomber	P	2	53.2	53.2	63.5	73.5	129.6	200	160	120										11	30
POL	BAL	1030	P20	P20/25	B	2	28.0	42.4	100.0	53.4		120	40											4	11
POL	BAL	1030	TV3	TV-3 930#	B	4	71.7	78.8			74.4	200	40											6.5	
POL	BAL	1030	WP53	WP53/64x4	P	4	53.0	53.0	88.0	86.0	217.6	800	100											22	32
RUS	MON		RTM	RTM33S	P																				
RUS	ATL	1764	RTA	70/300 project0495	P	4	70.0	70.0	75.0	101.3	300.0	7000	5000	4000	2000	800	400	200	100	80	60	45	37	28	41
FIN	JUL	750	1600'	Finflyder combi	P	4	86.0	86.0	60.0	160.3	467.2	3200	1600	800	290	120	80	40						23	38
SWE	ARG	1324	FOTOE	Fotö 3.2	P	4	60.2	60.2	108.0	98.0	260.0	6400	3200	1600	800	400	200	100	40					16	90
SWE	ARG	1324	MACRO	Macro 5A:1	P	4	86.0	86.0	108.0	98.0	205.0	6400	3200	1600	800	400	200	100	40					19	105

Table 4.3. Species list.

NODC	Scientific name	English name
3734030201	AURELIA AURITA	COMMON JELLYFISH
5704020401	SEPIETTA OWENIANA	
5706010401	ALLOTEUTHIS SUBULATA	
6188030110	CANCER PAGURUS	EDIBLE CRAB
8603010000	PETROMYZINIDAE	LAMPREYS
8603010217	LAMPETRA FLUVIATILIS	RIVER LAMPREY
8603010301	PETROMYZON MARINUS	SEA LAMPREY
8606010201	MYXINE GLUTINOSA	HAGFISH
8710010201	SQUALUS ACANTHIAS	SPURDOG / SPINY DOGFISH
8713040134	RAJA RADIATA	STARRY RAY
8741010102	ANGUILLA ANGUILLA	EEL
8747010000	CLUPEIDAE	HERRINGS
8747010109	ALOSA FALLAX	TWAITE SHAD
8747010201	CLUPEA HARENGUS	HERRING
8747011701	SPRATTUS SPRATTUS	SPRAT
8747012201	SARDINA PILCHARDUS	PILCHARD, SARDINE
8747020104	ENGRAULIS ENCRASICOLUS	ANCHOVY
8755010115	COREGONUS OXYRINCHUS / C. LAVARETUS	WHITEFISH / HOUTING / POWAN
8755010305	SALMO SALAR	SALMON
8755010306	SALMO TRUTTA	TROUT
8755030301	OSMERUS EPELANUS	SMELT
8756010237	ARGENTINA SPYRAENA	LESSER SILVERSMELT
8759010501	MAUROLICUS MUELLERI	PEARLSIDE
8776014401	RUTILUS RUTILUS	ROACH
8791030402	GADUS MORRHUA	COD
8791030901	POLLACHIUS VIRENS	SAITHE
8791031301	MELANOGRAMMUS AEGLEFINUS	HADDOCK
8791031501	RHINONEMUS CIMBRIUS	FOUR BEARDED ROCKLING
8791031701	TRISOPTERUS MINUTUS	POOR COD
8791031703	TRISOPTERUS ESMARKI	NORWAY POUT
8791031801	MERLANGIUS MERLANGIUS	WHITING
8791032201	MICROMESTISTIUS POTASSOU	BLUE WHITING
8791040105	MERLUCCIUS MERLUCCIUS	HAKE
8793010000	ZOARCIDAE	EEL-POUTS
8793010724	LYCODES VAHLII	VAHL'S EELPOUT
8793012001	ZOARCES VIVIPARUS	EELPOUT
8803020502	BELONE BELONE	GARFISH
8818010101	GASTEROSTEUS ACULEATUS	THREE-SPINED STICKLEBACK
8818010201	SPINACHIA SPINACHIA	SEA STICKLEBACK
8820020000	SYNGNATHIDAE	PIPE FISHES
8820020119	SYNGNATUS ROSTELLATUS	NILSSON'S PIPEFISH
8820020120	SYNGNATUS ACUS	GREAT PIPEFISH
8820020123	SYNGNATUS TYPHLE	DEEP-SNOUTED PIPEFISH
8820022101	ENTELURUS AEQUOREUS	SNAKE PIPEFISH
8826020601	EUTRIGLA GURNARDUS	GREY GURNARD
8831020825	COTTUS GOBIO	BULLHEAD
8831022205	MYOXOCEPHALUS QUADRICORNIS	FOUR SPINED SCULPIN
8831022207	MYOXOCEPHALUS SCORPIUS	BULL ROUT
8831024601	TAURULUS BUBALIS	SEA SCORPION
8831080803	AGONUS CATAPHRACTUS	POGGE
8831090828	LIPARIS LIPARIS	SEA SNAIL
8831091501	CYCLOPTERUS LUMPUS	LUMPFISH
8835020101	DICETRARCHUS LABRAX	BASS
8835200202	PERCA FLUVIATILIS	PERCH

Table 4.3 continued

NODC	Scientific name	English name
8835200403	STIZOSTEDION LUCIOPERCA	ZANDER (PIKEPERCH)
8835280103	TRACHURUS TRACHURUS	HORSE MACKEREL
8835450202	MULLUS SURMULETUS	RED MULLET
8839013501	CTENOLABRUS RUPESTRIS	GOLD SINNY
8840060102	TRACHINUS DRACO	GREATER WEEVER
8842120905	LUMPENUS LAMPRETAEFORMIS	SNAKE BLENNY
8842130209	PHOLIS GUNELLUS	BUTTERFISH
8845010000	AMMODYTIDAE	SANDEELS
8845010105	AMMODYTES TOBIANUS (LANCEA)	SAND EEL
8845010301	HYPEROPLUS LANCEOLATUS	GREATER SANDEEL
8846010106	CALLIONYMUS LYRA	SPOTTED DRAGONET
8846010107	CALLIONYMUS MACULATUS	DRAGONET
8847010000	GOBIIDAE	GOBIES
8847015101	POMATOSCHISTUS MINUTUS	SAND GOBY
8847015103	POMATOSCHISTUS MICROPS	COMMON GOBY
8847016701	LESUEURIGOBIUS FRIESSII	FRIESES' GOBY
8850030302	SCOMBER SCOMBRUS	MACKEREL
8857030402	SCOPHTHALMUS MAXIMUS	TURBOT
8857030403	SCOPHTHALMUS RHOMBUS	BRILL
8857031702	ARNOGLOSSUS LATERNA	SCALDFISH
8857040603	HIPPOGLOSSOIDES PLATESSOIDES	LONG ROUGH DAB
8857040904	LIMANDA LIMANDA	DAB
8857041202	MICROSTOMUS KITT	LEMON SOLE
8857041402	PLATICHTHYS FLESUS	FLOUNDER
8857041502	PLEURONECTES PLATESSA	PLAICE
8858010601	SOLEA SOLEA	SOLE
8858010801	BUGLOSSIDIUM LUTEUM	SOLENETTE

Table 5.7 Target strength parameters

Species	a	b	d
Clupea harengus	-71.2	20	9.533E-07
Sprattus sprattus	-71.2	20	9.533E-07
Gadus morhua	-67.5	20	2.235E-06
Trachurus trachurus	-71.2	20	9.533E-07
Scomber scombrus	-84.9	20	4.066E-08

Table 6.1. Data exchange format.

Table 3.x.1 Estimated numbers (millions) of herring r/v "XXXX" October

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+

Table 3.x.2 Estimated mean weight (gram) of herring r/v "XXXX" October

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+

Table 3.x.3 Estimated numbers (millions) of sprat r/v "XXXX" October

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+

Table 3.x.4 Estimated mean weight (gram) of sprat r/v "XXXX" October

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+

Table 3.x.5 Survey statistics r/v "XXXX" October

ICES SD	ICES Rect.	Area (nm^2)	Sa (m^2/nm^2)	σ cm^2	N total (million)	herring (%)	sprat (%)

Table 6.2. Structure of BAD1.

Structure of table AH

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SD	C	4		ICES Sub-division
RECT	C	5		ICES rectangle
NHTOT	N	8	2	Total herring abundance (millions)
NH0	N	8	2	Abundance of herring age group 0 (millions)
NH1	N	8	2	Abundance of herring age group 1 (millions)
NH2	N	8	2	Abundance of herring age group 2 (millions)
NH3	N	8	2	Abundance of herring age group 3 (millions)
NH4	N	8	2	Abundance of herring age group 4 (millions)
NH5	N	8	2	Abundance of herring age group 5 (millions)
NH6	N	8	2	Abundance of herring age group 6 (millions)
NH7	N	8	2	Abundance of herring age group 7 (millions)
NH8	N	8	2	Abundance of herring age group 8+ (millions)

Structure of table AS

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SD	C	4		ICES Sub-division
RECT	C	5		ICES rectangle
NSTOT	N	8	2	Total sprat abundance (millions)
NS0	N	8	2	Abundance of sprat age group 0 (millions)
NS1	N	8	2	Abundance of sprat age group 1 (millions)
NS2	N	8	2	Abundance of sprat age group 2 (millions)
NS3	N	8	2	Abundance of sprat age group 3 (millions)
NS4	N	8	2	Abundance of sprat age group 4 (millions)
NS5	N	8	2	Abundance of sprat age group 5 (millions)
NS6	N	8	2	Abundance of sprat age group 6 (millions)
NS7	N	8	2	Abundance of sprat age group 7 (millions)
NS8	N	8	2	Abundance of sprat age group 8+ (millions)

Structure of table WH

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SD	C	4		ICES Sub-division
RECT	C	5		ICES rectangle
WHTOT	N	7	2	Total mean weight of herring (gram)
WH0	N	7	2	Mean weight of herring age group 0 (gram)
WH1	N	7	2	Mean weight of herring age group 1 (gram)
WH2	N	7	2	Mean weight of herring age group 2 (gram)
WH3	N	7	2	Mean weight of herring age group 3 (gram)
WH4	N	7	2	Mean weight of herring age group 4 (gram)
WH5	N	7	2	Mean weight of herring age group 5 (gram)
WH6	N	7	2	Mean weight of herring age group 6 (gram)
WH7	N	7	2	Mean weight of herring age group 7 (gram)
WH8	N	7	2	Mean weight of herring age group 8+ (gram)

Table 6.2 continued

Structure of table WS

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SD	C	4		ICES Sub-division
RECT	C	5		ICES rectangle
WSTOT	N	7	2	Total mean weight of sprat (gram)
WS0	N	7	2	Abundance of sprat age group 0 (gram)
WS1	N	7	2	Abundance of sprat age group 1 (gram)
WS2	N	7	2	Abundance of sprat age group 2 (gram)
WS3	N	7	2	Abundance of sprat age group 3 (gram)
WS4	N	7	2	Abundance of sprat age group 4 (gram)
WS5	N	7	2	Abundance of sprat age group 5 (gram)
WS6	N	7	2	Abundance of sprat age group 6 (gram)
WS7	N	7	2	Abundance of sprat age group 7 (gram)
WS8	N	7	2	Abundance of sprat age group 8+ (gram)

Structure of table ST

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SD	C	4		ICES Sub-division
RECT	C	5		ICES rectangle
AREA	N	7	1	Area [nm^2] see
SA	N	7	1	Mean Sa [m^2/nm^2]
SIGMA	N	7	3	Mean σ [m^2/nm^2] see formula (5.8.3)
NTOT	N	8	2	Total number of fish (millions) see formula (5.9.1)
HH	N	7	3	Percentage of herring
HS	N	7	3	Percentage of sprat

Struture of table SU

Field	Type	Length	Decimals	Description
CCODE	C	7		Survey code
SHIP	C	20		Name of the vessel
YEAR	C	5		Survey year

APPENDIX 1 – LIST OF SYMBOLS

a	age group
i	species
j	length class
k	haul
a_i, b_i, d_i	parameter of the TS-length relation for species i
f_i	frequency of species i
f_a	frequency of age group a
f_j	frequency of length j
f_{ij}	frequency of length class j for species i
f_{ia}	frequency of age group a for species i
n_{ik}	fish number of species i in haul k
n_{ijk}	fish number of species i and length class j in haul k
q_{ai}	normalised age-length-key
A	Area of the stratum
F	fish density
L_j	length in class j
M	number of hauls in the stratum
M_i	number of hauls containing species i
N_k	total fish number in haul k
N_{ik}	fish number of species i in haul k
N_i	abundance of species i
N_{ia}	abundance of age group a for species i
N	total abundance
S_a	area scattering cross section
W_j	mean weight in length class j
W_a	mean weight of age group a
Q_{ai}	biomass of age group a for species i
$<\sigma>$	mean cross section
$<\sigma_i>$	mean cross section of species i

APPENDIX 2 – CALIBRATION PROCEDURES

Centering of split beam

The purpose of this operation is to move the immersed, suspended sphere onto the acoustic axis of the transducer. First the echo sounder should be set so that the echo from sphere is visible on the display.

Select the Transceiver menu and set:

Mode: Active
Pulse length: Medium
Bandwidth: Wide
Transducer depth: 0.0 m

Select the Operation menu and set:

Ping mode: Normal
Ping interval: 1.0 sec.
Noise margin: 0 dB

Select the Display/Echogram menu and set

Range: Select a range from the sea surface well below the sphere
Range start: 0.0 m
Auto range: Off
Bot. Range Pres.: Off
Presentation: Normal
Layer lines: On
Integration lines: 10 000
TVG: 40 log R
TS colour min.: -50 dB

Select the Log menu and set

Mode: Ping
Ping interval: 100

Select the Layer menu and set

Super layer: 1

Select the Layer menu/Layer-1 menu and set

Type: Surface
Range:
and Range start: The range must be wide enough to cover the sphere echo during the movements in the centering operation. Otherwise it should be as narrow as possible, in order to exclude disturbing fish echoes. Be sure that also the bottom echo as well as the trailing edge of the transmitter pulse and the echo from the additional weight are outside the layer.

Margin: 0.0 m
Sv Threshold: -80 dB
No. of sublayers: 1

The rest of the sub-layers should be turned off.

Select the TS-detection menu and set

Min. value: -50 dB
Min. echo length: 0.8
Max. echo length: 1.8
Max. gain comp.: 6.0 dB
Max. phase dev.: 2.0

The best value for the sound velocity should be set in the sound velocity menu in order to keep the accuracy as high as possible for the calibration exercise.

If the sphere is in the beam an echo will now be seen as a steady line in the echogram. If the sphere furthermore is inside the -6 dB limit of the beam, the echo will show up as a dot on the TS-detection window on the left side of the screen. The horizontal projection makes it easy to see which way the sphere must be moved to reach the beam center. Movement of the sphere occurs by turning various winches, always one winch at a time and on specific command by the director of this procedure, who is guided by constant observation of the echo on the screen.

s_A - measurement

A test and if necessary, a calibration of the s_A -calculation may be carried out according to the following procedure.

Check the cable connections to colour printer-1.
Switch on colour printer-1.

Select the printer menu and set

Integration tables: Number of the transceiver in use (if EK 500)
Echogram: Slave

The echogram recording will then be similar to the one on display. Read the measured s_A - value, the red number in the integrator table after each log interval. Calculate the theoretical s_A - value as follows:

TS sphere = target strength of the sphere
σ_{bs} = backscattering cross section of the sphere
$\sigma_{bs} = 10^{TS\ sphere/10}$
r = distance between the transducer and the sphere
(read from display screen, underneath the horizontal projection window).

If the recommended minimum of 15 m between the transducer and the calibration sphere for 38 kHz frequency cannot be attained, the absolute minimum distance to attain the theoretical accuracy of $\pm$0.1 dB for the s_A -calibration is 10 m (transducer type ES38B, max. TX power 2000 W).

The measured distance to the calibration sphere in the TS Detection menu will always be larger than the correct distance. The measured distance has to be reduced by the distance given in the table below and used when calculating the theoretical s_A - value. The given data is based on medium TX pulse with Wide Bandwidth and long TX pulse with Narrow Bandwidth (frequency 38 kHz).

Reduce distance r by 0.30 m when using Wide Bandwidth and 0.9 m when using Narrow Bandwidth.

ψ = equivalent 2-way beam angle (from the measurement data delivered with the transducer).

$\psi = 10^{dB\text{–}value/10}$

s_A (theory) = $(4\Pi r_0^2)\ \sigma_{bs}\ (1852 m/nm)^2 / \psi\ r^2$

where r_0 = 1 meter is the standard reference distance for backscattering

Appendix 2 continued

If the measured s_A -value differs from the theoretical value, this can be corrected by changing the S_V Transducer Gain in the Transceiver menu. Calculate a new transducer gain:

New trans. gain = Old trans. gain + 10 log(s_A(measured)/ s_A(theory))/2

Enter the S_V Transducer Gain in the Transducer menu, and the measured s_A -value will be correct.

The calibration conditions and results are recorder in a calibration report.

ANNEX 4

International Acoustic Survey Database Exchange Format Specification

Version 1

Rev. V

March 2000

TABLE OF CONTENTS

Section **Page**

1 INTRODUCTION

This document specifies the exchange format for the acoustic/biological data, for the herring/sprat surveys in the North Sea and the Baltic Sea, to be added into the international herring/sprat survey database as stated in [Working Paper 1998].

The exchange format is a result of the work of the Danish institute for Fisheries Research IT department, initiated approximately 1 June 1998 presented and revised at the working group meeting for the 'Planning group for Herring Surveys' in Hirtshals 1–5 February 1999, and at the Baltic Fisheries Assessment Working Group meeting in Copenhagen, 12–14 April 1999.

It was stated at the meeting in Hirtshals, that this is intended to be an exchange format that in time must become a standalone format, not depending on existing, for this purpose, inadequate and outdated formats. For the time being, this is merely a step in the right direction. It is important to state, that the exchange format as presented in this document, is a two part format, part one being the ASCII, fixed length record, file format with the limitations these has, and part two, the XML based exchange format.

The XML format has, in the exchange format it self, the ability to make syntax/semantics and range check. The condition of whether a field is optional or mandatory is also possible to check in the XML format (See section on 'The XML file format for data exchange').

The primary reason for this division is, that some of the member countries in the 'Planning group for Herring Surveys', do not have the man power to overcome the effort, for the time being, to make applications for extracting data, from their data sources, directly into the XML file format. The XML exchange format version is presented herein, as THE exchange format, and the ASCII files being used as a temporary solution until it's convenient for all participants to go directly from data source to XML file format.

In the definition of the biological data (fisheries data), the appendices containing the lookup tables for ships, species and other defined in [IBTS Rev. V] and [BITS 1998].

This document is based on [IBTS Rev. V], [Working Paper 1998], [BITS 1998], [Requirements Specification for the HERSUR Project, Rev. 1], decisions made at the working group meeting of the 'Planning group for Herring Surveys' in Hirtshals 1–5 February 1999, the Baltic Fisheries Assessment Working Group meeting, Copenhagen 12–14 April 1999 and the Baltic International Fish Survey Working Group meeting in Tallinn, 2–6 August 1999.

Note: Appendices II through VIII are taken in entirety from [IBTS Rev. V] and [BITS 1998] for the sole purpose of this document to be considered as standalone.

1 OVERALL EXCHANGE FORMAT CONSIDERATIONS

1.1 GENERAL INFORMATION

The format specification is divided into two parts, as stated in the introduction part of this document. The first part describes the ASCII file exchange format (record structure, record types, field structure, field types) that for the time being is used as the interface to the XML file format.

This ASCII file format uses the IBTS Rev. V exchange format with the HERSUR projects extensions, as basis for extracting data from the member countries data sources. The record types used are the following:

<u>Cruise</u>

Cruise info record

<u>Acoustic Data</u>

Sa record for acoustic data

<u>Biological Data</u>

Records type 1 (HH) from the IBTS exchange format: Detailed haul information.

Records type 1A (HE) from the IBTS exchange format: Additional haul information, and extended HERSUR specific add-on fields.

Records type 2 (HL) from the IBTS exchange format: Length frequency data.

Records type 4 (CA) from the IBTS exchange format: Sex-maturity-age-length keys (SMALK) and extended HERSUR specific add-on fields.

1.2 RECORDS MUTUAL DEPENDENCIES

AS FOR FIELDS THE SAME IS THE MATTER FOR RECORDS, SOME ARE OPTIONAL, AND SOME ARE MANDATORY.

In the exchange format, the CRUISE INFO record always is mandatory. Without this record, it’s impossible to place the data in the database.

As for the acoustic data, it’s optional, because if it’s an update, it’s possible that one wants to update biological data, without updating acoustic data.

The other way around, it’s possible, that you want to update acoustic information, without updating biological data. The figure below shows the dependencies.

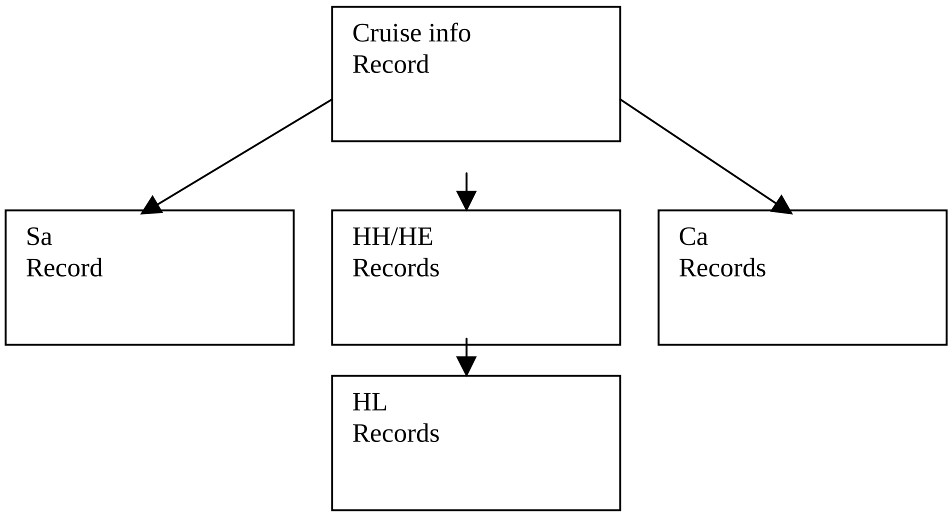


Figure 1. Record dependencies.

1.3 FILE FORMAT

The record of type CRUISE_INFO is mandatory. A number of Sa-records, and/or a number of HH/HE+HL records, and/or a number of CA records MUST follow the record.

The biological records must be ordered in such a way that each record of Type 1/1A (HH/HE) is followed by a variable number of records of Type 2 (HL), ordered by species. The number and kinds of species recorded must agree with the species recording code as specified in record Type 1. For examples of the various codes see Appendix V.

The header record fields that has been altered (lengthwise) has been put into HE record as added fields to maintain compatibility with the ICES IBTS/BITS exchange formats. Changes made on ranges for some fields have been made directly in the record. Regarding ranges on gear, some of the values might need to be changed to more practical figures (for pelagic fishing).

Records of Type 4 (CA) should follow at the end of the file after the last species record of Type 2 (HL) for the last haul if present in the same transmission.

General

In some cases alpha numeric fields that were mandatory in ICES IBTS/BITS but could contain space characters as value for ‘NOT KNOWN’ or ‘NOT MEASURED’ has been converted to optional, because checking for the presence of a field gives no meaning when a value of ‘NOT PRESENT’ is possible.

2 GENERAL CRUISE INFO

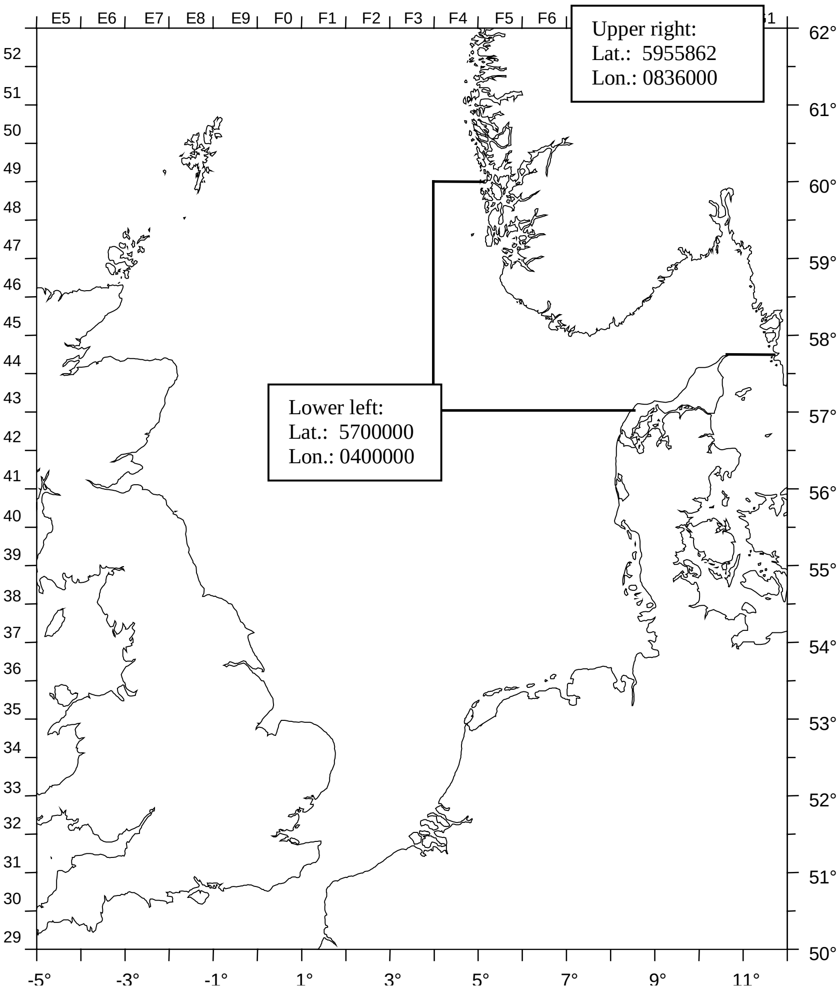
2.1 CRUISE INFO RECORD (CI)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1 - 2	Record type	2A	M		Fixed value CI (Cruise Info).
3 - 5	Country	3A	M	See Appendix III	ICES alpha code for Countries.
6 - 9	Ship	4AN	M	See Appendix III	
10 - 11	Cruise No.	2N	M		National coding system.
12 - 15	Year	4A	M	YYYY	
16 - 19	Date of cruise start	4N	M	MMDD	
20 - 23	Date of cruise end	4N	M	MMDD	
24 - 31	Upper right corner latitude	8AN	O	±DDMMSSS***	±=N/S, Seconds in thousands of a minute
32 - 39	Upper right corner longitude	8AN	O	±DDMMSSS***	±=E/W, Seconds in thousands of a minute
40 - 47	Lower left corner latitude	8AN	O	±DDMMSSS***	±=N/S, Seconds in thousands of a minute
48 - 55	Lower left corner longitude	8AN	O	±DDMMSSS***	±=E/W, Seconds in thousands of a minute
56 - 85	Acoustic contact firstname	30A	O		
86 - 115	Acoustic contact lastname	30A	O		
116 - 175	Acoustic contact email	60AN	O		
176 - 205	Fisheries contact firstname	30A	O		
206 - 235	Fisheries contact lastname	30A	O		
236 - 295	Fisheries contact email	60AN	O		
296 - 297	Sounder	2AN	M		See Appendix IA 'HERSUR/BALTDAT specific lookup tables'

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information. All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional. For all optional fields spaces are valid and indicate not known.

*** DD = Degrees, MM = Minutes, SSS = Thousands of a minute



3 ACOUSTIC DATA

3.1 SA RECORD (SA)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1 - 2	Record type	2A	M		Fixed value SA (acoustic record).
3 - 5	Country	3A	M	See Appendix III	ICES alpha code for Countries.
6 - 9	Ship	4AN	M		See Appendix III
10 - 11	Cruise No.	2N	M		National coding system.
12 - 15	Year	4N	M	YYYY	
16 - 19	Date	4N	M	MMDD	
20 - 25	Start time	6N	M	HHMMSS	**Either Start Time or End Time MUST be available.**
26 - 31	End time	6N	O	HHMMSS	**Either Start Time or End Time MUST be available.**
32 - 37	Log Counter	6N	M	5+1 decimal value	0-999999
38 - 41	Transducer Depth	4N	O	3+1 decimal	0-9999
42	Transducer Number	1N	O		0-9 if more then one transducer is used
43 - 46	Transducer Frequency	4N	M	3+1 decimal	in kHz
47	Distance/time/ping	1A	M	D/T/P	
48 - 53	Sampling interval	6N	M	5+1 decimal	No. Miles/Time/Ping (ESDU)
54 - 61	Start latitude	8AN	O	±DDMMSSS***	The latitude of the starting position **Either start position or end position of the Integration MUST be available.**
62 - 69	Start longitude	8AN	O	±DDMMSSS***	The longitude of the starting position **Either start position or end position of the Integration MUST be available.**
70 - 77	End latitude	8AN	O	±DDMMSSS***	The latitude of the ending position **Either start position or end position of the Integration MUST be available.**
78 - 85	End longitude	8AN	O	±DDMMSSS***	The longitude of the ending position **Either start position or end position of the Integration MUST be available.**
86 - 89	Mean depth	4N	O		Mean total ground depth in metres below sea surface
90 - 99	Species code	10A	M		Species code (As for the IBTS database) **MIXED = 10 M's**
100 - 109	Sa	10N	M	XXXXXXXXXX	5+ 5 decimal (implied decimal point) Calibrated Sa value in m^2 pr. nm numeric, 0 values shall be included when Sa are allocated to herring and sprat. There must be **NO OVERLAPPING LAYERS.**
110 - 113	Species depth	4N	O	The mean depth of the concentrations of herring, sprat or mixed layers, as more layers can be present in the same area.	
114 –117	Layer Top	4N	M	3 + 1decimal	Positive: Below the sea surface Negative: Above sea bottom (only bottom layer)
118 - 121	Layer Thickness	4N	O	3 + 1decimal	
122 - 123	Classification	2N	O		See appendix I B
124 - 127	Haul ref.	4AN	O		Either haulreferance (3 digits numeric) or ICES square reference

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional. For all optional fields spaces are valid and indicate not known.

*** Position: DD = Degrees, MM = Minutes, SSS = Thousands of a minute

4 BIOLOGICAL DATA (FISHERIES)

4.1 RECORD TYPE 1 (HH)

SPECIFICATIONS FOR RECORD TYPE 1 (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1- 2	Record type	2A	M	Fixed value HH.	
3	Quarter	1N	M	1 to 4	
4- 6	Country	3A	M	See Appendix III	ICES alpha code for Countries.
7- 10	Ship	4AN	M	See Appendix III	
11- 20	Gear	10A	M	See Appendix IV	Preliminary code. 1)
21- 26	Station no	6AN	O		National coding system.
27- 29	Haul no	3N	M	1 to 999	Sequential numbering by cruise.
30- 31	Year	2N	M		Year is also available from Cruise Info Record
32- 33	Month	2N	M	1 to 12	
34- 35	Day	2N	M	1 to 28/29/30/31	
36- 39	Time shot	4N	M	1 to 2400, 9999	In UTC.
40- 42	Haul duration	3N	M	5 to 90	In minutes.
43	Day/Night	1A	M	D, N, space	Not known = space filled.
44- 45	Lat. Degrees	2N	M	50 to 65	Shooting position: Degrees Latitude.
46- 47	Lat. Minutes	2N	M	0 to 59	Shooting position: Min. Latitude.
48- 49	Lon. Degrees	2N	M	0 to 28	Shooting position: Degrees Longitude.
50- 51	Lon. Minutes	2N	M	0 to 59	Shooting position: Min. Longitude.
52	East/West	1A	M	E, W	
53- 55	Depth	3N	M		Depth from sea surface in meters: not known=0.
56	Haul validity	1A	M	I, P, V	Invalid = I. Partly valid = P Valid = V. 2)
57- 64	Hydrographic Station number	8AN	O		Station number as reported to the ICES hydrographer.
65- 66	Species Recording Code	2N	M	See Appendix V	
67- 69	Net opening	3N	NU	25 to 100	In meters*10.
70- 73	Distance	4N	O	0 to 9999	Distance towed over ground in meters.
74- 76	Warp length	3N	O	0 to 999	In meters.
77- 78	Warp diameter	2N	O	10 to 60	In millimetres.
79- 81	Door surface	3N	O	0 to 100	In square meters*10.
82- 85	Door weight	4N	O	100 to 2000	In kilograms.
86- 89	Buoyancy	4N	O	50 to 200	In kilograms.
90- 91	Kite dimensions	2N	O	5 to 20	In square meters*10.
92- 95	Weight ground Rope	4N	O	0 to 300	In kilograms.
96- 98	Door spread	3N	O	50 to 180	In meters.
99- 100	Padding field	2A	M	Spaces	Filled up with spaces.

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information. All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M= mandatory, O= optional. For all optional fields spaces are valid and indicate not known. NU= Not used (See elsewhere for similar field)

COMMENTS:
NB: FOR INVALID HAULS NO SPECIES INFORMATION NEED TO BE GIVEN

4.2 RECORD TYPE 1A (HE)

SPECIFICATIONS FOR RECORD TYPE 1A (Haul information)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1-2	Record type	2A	M	Fixed value HE.	
3	Quarter	1N	M	1 to 4	
4-6	Country	3A	M	See Appendix III	ICES alpha code for Countries.
7-10	Ship	4AN	M	See Appendix III	
11-20	Gear	10A	M	See Appendix IV	Preliminary code. 1)
21-26	Station no	6AN	O		National coding system.
27-29	Haul no	3N	M	1 to 999	Sequential numbering by cruise.
30-31	Year	2N	M	65 to 99	
32-33	Lat. Degrees	2N	M	50 to 65	Hauling position: Degr. Latitude.
34-35	Lat. Minutes	2N	M	0 to 59	Hauling position: Min. Latitude.
36-37	Lon. Degrees	2N	M	0 to 28	Hauling position: Degr. Longitude.
38-39	Lon. Minutes	2N	M	0 to 59	Hauling position: Min. Longitude.
40	East/West	1A	M	E, W	Hauling position:
41-43	Towing direction	3N	O	1 to 360	
44-5	Ground speed	2N	O	20 to 60	Ground speed of trawl. Knots*10
46-47	Speed through Water	2N	O	10 to 99	Trawl speed through. Knots*10
48-49	Wing spread	2N	O	12 to 30	In meters.
50-52	Surface current Direction	3N	O	0 to 360	0 slack water
53-55	Surface current Speed	3N	O	0 to 100	Meters per sec*10
56-58	Bottom current Direction	3N	O	0 to 360	0 slack water
59-61	Bottom current Speed	3N	O	0 to 100	Meters per sec*10
62-64	Wind direction	3N	O	0 to 360	
65-67	Wind speed	3N	O	0 to 100	Meters per sec
68-70	Swell direction	3N	O	0 to 360	
71-73	Swell height	3N	O	0 to 999	Metres*10
***74-77	Net opening	4N	O	0000 to 9999	In meters *10
***78–80	Lat. Decimals	3N	M		Shooting position (thousands of a minute). **Note: if rounded = 000, else truncated value.**
***81 - 83	Lon. Decimals	3N	M		Shooting position (thousands of a minute). **Note: if rounded = 000, else truncated value.**
***84-85	Fishing Strategy	2AN	O		See Appendix I (example: D5 = Day composite haul)
***86-88	Headrope Depth	3N	M	1-999	In meters
89-100	Padding field	12A	M	Spaces	Filled up with spaces.

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M=mandatory, O=optional.

*** Field added for the HERSUR/BALTDAT projects
For all optional fields spaces are valid and indicate not known.

4.3 RECORD TYPE 2 (HL)

SPECIFICATIONS FOR RECORD TYPE 2 (Length frequency distribution)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS

1-2	Record type	2A	M	Fixed value HL.	
3	Quarter	1N	M	1 to 4	Identical to Record Type 1.
4-6	Country	3A	M	See Appendix III	idem
7-10	Ship	4AN	M	See Appendix III	idem
11-20	Gear	10A	M	See Appendix IV	idem
21-26	Station no	6AN	O	idem	
27-29	Haul no	3N	M	1 to 999	idem
30-31	Year	2N	M	65 to 99	idem
32-41	Species code	10A	M	See Appendix VII	Official NODC-code.
42-43	Validity code	2N	M	See Appendix VIII	
44-50	No/hour	7N	O	0 to 9999999	No. of specimens caught per hour.
51-55	Catch Weight /Hour	5N	O	0 to 99999	In 100g. Not known= spaces. 1)
56-58	No measured	3N	M	0 to 999	Not known=spaces. 2)
59	Length code	1AN	M	., 0, 1, 5, 9	Class: 1mm =. 0.5 cm=0 1 cm =1 2 cm =2 5 cm =5
60-62	Length class	3N	M	1 to 999	Indentifier: lower bound of size class, eg. 65-70cm=65. For classes less than 1 cm there will be an implied decimal point after the 2nd digit, eg. 30.5-31.0cm=305.
63-68	No at length	6N	M	1 to 999999	Length classes with zero catch should be excluded from the record (N/hour equals the sum of No at Length).
69	Sex	1A	O	M,F	M=male, F=female
***70-76	No.	7N	M	0 to 9999999	No. Of specimens caught.
***77- 82	Catch Weight	6N	M	0 to 99999	In 100g.
83-100	Padding field	31A	M	Spaces	Filled up with spaces

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information.
All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled.

** M = mandatory, O = optional.
For all optional fields spaces are valid and indicate not known.

*** Field added for the HERSUR/BALTDAT projects

COMMENTS:

Total catch weights should be given per hour fishing.
If the number measured is zero then the remainder of the record should be filled with spaces.
Size classes smaller than those defined in the IYFS manual for reporting length distributions of the various species are allowed.

4.4 RECORD TYPE 4 (CA)

SPECIFICATION FOR RECORD TYPE 4 (SMALK's)

POSITION	NAME	TYPE*	M/O**	RANGE	COMMENTS
1-2	Record type	2A	M	Fixed value CA.	
3	Quarter	1N	M	1 to 4	Identical to Record Type 1.
4-6	Country	3A	M	See Appendix III, ALL	idem
7-10	Ship	4AN	O	See Appendix III idem	1)
11-20	Gear	10A	O	See Appendix IV	idem 1)
21-26	Station no	6AN	O		idem 1)
27-29	Haul no	3N	M	1 to 999	idem 1)
30-31	Year	2N	M	65 to 99	idem
32-41	Species code	10A	M	See Appendix VII	Official NODC-code.
42-43	Area/subarea type (North Sea/Baltic)	2N	M	0 to 3	ICES Statistical rectangles =0 Four Statistical rectangles =1 Standard NS Roundfish areas =2 Herring Sampling areas =3
				20 to 32	ICES Baltic Subdivision Area
44-47	Area code	4AN	M		
48-51	Padding field	4A	M	Spaces	Filled up with spaces.
52	Length code	1AN	M	., 0, 1, 2, 5	Class: 0.1cm =. 0.5 cm =0 1 cm =1 2 cm =2 5 cm =5 (+Group not allowed).
53-55	Length class	3N	M	1 to 999	idem
56	Sex	1A	O	M, F	Male = M, Female = F,
57	Maturity	1AN	O	1 to 5	See Appendix II
58	+gr. Ident.	1A	M	+, space	Plus group = + else space.
59-60	Age/rings	2N	O	0 to 99	
61-63	Number	3N	M	1 to 999	
64-100	Padding field	37A	M	Spaces	Filled up with spaces.

* All numeric fields (N) right justified, zero filled, except when spaces are used to indicate no information. All alpha (A) and mixed alpha/numeric fields (AN) left justified, space filled, except Area code which is to be right justified, space filled.

** M = mandatory, O = optional. For all optional fields spaces are valid and indicate not known.

COMMENTS:

Otolith samples may refer to an individual haul or to groups of hauls in the same rectangle or within one sampling area, depending on the procedures on board. If detailed information is available, it would seem appropriate to refer back to the haul no and/or rectangle; these data are optional rather than mandatory.
See Record Type 2.
Sex maturity data are explicitly demanded for roundfish.
A plus group refers to the age indicated AND older, respectively to a reading of more than or equal to the specified number of rings.

For herring and sprat the number of rings must be recorded. For all other species the age.

An additional field has been reserved for no of fish, which allows the information to be presented in a more aggregated form, rather than that identical information has to be recorded for all individual fish of the same size, sex, maturity and age group.

5 THE XML FILE FORMAT FOR DATA EXCHANGE

5.1 THE XML FORMAT

XML is an acronym for e**X**tensible **M**arkup **L**anguage, and as anyone knows who have had a little bit to do with the Internet, the language in which homepages are presented to an Internet Browser, is called HTML (Hyper Text Markup Language), and are the standard for internet homepage publications. To exchange data over the Internet a group of the best Internet developers was put together, and have developed the XML exchange format.

The XML format is becoming THE internet standard for documents of ordered data (invoices, databases etc.) exchanging.

The advantages of the XML format goes way beyond the fact, that one imposes a great deal of overhead on data, when converting the traditional file formats with fixed length records to the XML tag file format. Advantages such as automatic type checking, syntax and semantics checking along with range and conditional presence of fields almost without any programming. This gives applications that are easy to maintain, as one can concentrate the efforts on essential matters.

The XML language can not be explained in half a page, but it can be reviewed at the homepage of the World Wide Web Consortium (http://www.w3.org). The handling of the XML files are done according to the 'Document Object Model, version 1', proposed as a standard by W3C 18. August 1998, also to be found on (http://www.w3.org).

In here the exchange file format will be explained for the clients to make the files themselves, unless the IBTSASCII2XML option, in the Internet application, is used.

5.2 THE EXCHANGE FORMAT FILE

The exchange file consists of ‘headers’ (tags) and data, ordered in a way so that one can see where the data starts, and where it ends.

```
Example:                                               Comments (not to be enclosed):
<?xml version="1.0" encoding="ISO-8859-1"?>            (this states that it's an XML
                                                       file and it's version 1.0)

<HERSURRecordUpDate xmlns="x-schema:Schema.xml">(this is the 'section header'
                                                       begin tag for the exchange
                                                       file)


</CruiseInfoRecord>
<AcousticRecords>
        <saRecord>                                     (sa Record data)
        </saRecord>
        .
        .
        .
</Acousticrecords>
<FisheriesRecords>                                     (Fisheries data except CA, SMALK, records)
        <HHRecord>
        </HHRecord>
        <HERecord>
        </HERecord>
        <HLRecord>
        </HLRecord>
        .
        .
        .
        <HHRecord>
        </HHRecord>
        <HERecord>
        </HERecord>
        <HLRecord>
        </HLRecord>
        .
        .
        .
</FisheriesRecords>
<SMALKRecords>
        <CARecord>                                     (CA, SMALK, Record)
        </CARecord>
        .
        .
        .
</SMALKRecords
</HERSURRecordUpDate>                                  (End of file)
```

In the file, the Cruise Info record is mandatory; but the acoustic records, the fisheries records and the SMALK records are optional as groups. They must, however, contain at least one of each child record type when present, and there MUST be at least one of the groups present in the file. In Appendix X there is a XML file with:

1 record of each recordtype just to show how it should be formatted.

Note: For now the ranges of the individual fields can be taken directly from the ‘ASCII (IBTS/BITS)’ versions of the records. **BUT** :

YEAR fields in XML are 4 character fields (i.e. 1999 and not 99 as in the fixed length IBTS/BITS formats).

In HH/HE/HL/CA records,GEAR field is divided into 4 separate fields (See Appendix IV Note on this issue):

- Gear — Mandatory for the gear name (AlphaNumerical)
- SweepLength — Optional field with sweep length in meters (3 Numerical)
- Exceptions — Optional field (1 Alpha)
- DoorType — Optional field (1 Alpha)

5.2.1 The Cruise Info record

The cruise info record definition is defined in the following:

<CruiseInfoRecord RecordType="CI">

<Country>	</Country>	String	M
<Ship>	</Ship>	String	M
<CruiseNo>	</CruiseNo>	Integer	M
<Year>	</Year>	Integer	M
<DateStart>	</DateStart>	String	M
<DateEnd>	</DateEnd>	String	M
<UpperRightCornerLatitude>	</UpperRightCornerLatitude>	String	O
<UpperRightCornerLongitude>	</UpperRightCornerLongitude>	String	O
<LowerLeftCornerLatitude>	</LowerLeftCornerLatitude>	String	O
<LowerLeftCornerLongitude>	</LowerLeftCornerLongitude>	String	O
<AcousticContactFirstName>	</AcousticContactFirstName>	String	O
<AcousticContactLastName>	</AcousticContactLastName>	String	O
<AcousticContactEmail>	</AcousticContactEmail>	String	O
<FisheriesContactFirstName>	</FisheriesContactFirstName>	String	O
<FisheriesContactLastName>	</FisheriesContLastName>	String	O
<FisheriesContactEmail>	</FisheriesContactEmail>	String	O
<Sounder>	</Sounder>	String	M

</CruiseInfoRecord>

5.2.2 The acoustics records

<AcousticRecords>

<saRecord RecordType="SA">

<Country>	</Country>	String	M
<Ship>	</Ship>	String	M
<CruiseNo>	</CruiseNo>	Integer	M
<Year>	</Year>	Integer	M
<Date>	</Date>	String	M
<StartTime>	</StartTime>	String	M
<EndTime>	</EndTime>	String	O
<LogCounter>	</LogCounter>	Float	M
<TransducerDepth>	</TransducerDepth>	Float	O
<TransducerNumber>	</TransducerNumber>	Integer	O
<TransducerFrequency>	</TransducerFrequency>	Float	M
<DistanceTimePing>	</DistanceTimePing>	String	M
<SamplingInterval>	</SamplingInterval>	Float	M
<StartLatitude>	</StartLatitude>	String	O
<StartLongitude>	</StartLongitude>	String	O
<EndLatitude>	</EndLatitude>	String	O
<EndLongitude>	</EndLongitude>	String	O
<MeanDepth>	</MeanDepth>	Integer	O
<SpeciesCode>	</SpeciesCode>	String	M
<Sa>	</Sa>	Float	M
<SpeciesDepth>	</SpeciesDepth>	Integer	O
<LayerTop>	</LayerTop>	Float	M
<LayerThickness>	</LayerThickness>	Float	O
<Classification>	</Classification>	Integer	O
<HaulRef>	</HaulRef>	String	O

</saRecord>

.

.

.

.

.

</AcousticRecords>

5.2.3 Biological Data (Fisheries)

For each haul there must be one HH record and one HE, and then there will be a number of HL records following.

<FisheriesRecords>

<HHRecord RecordType="HH">

<Quarter>	</Quarter>		Integer	M
<Country>	</Country>		String	M
<Ship>	</Ship>		String	M
<Gear>	</Gear>		String	M
<SweepLength>	</SweepLength>		String	O
<Exceptions>	</Exceptions>		String	O
<DoorType>	</DoorType>		String	O
<StationNo>	</StationNo>		String	O
<HaulNo>	</HaulNo>		Integer	M
<Year>	</Year>		Integer	M
<Month>	</Month>		Integer	M
<Day>	</Day>		Integer	M
<TimeShot>	</TimeShot>		Integer	M
<HaulDuration>	</HaulDuration>		Integer	M
<DayNight>	</DayNight>		String	O
<LatDegrees>	</LatDegrees>		Integer	M
<LatMinutes>	</LatMinutes>		Integer	M
<LonDegrees>	</LonDegrees>		Integer	M
<LonMinutes>	</LonMinutes>		Integer	M
<EastWest>	</EastWest>		String	M
<Depth>	</Depth>		Integer	M
<HaulValidity>	</HaulValidity>		String	M
<HydrographicStationNumber>	</HydrographicStationNumber>		String	M
<SpeciesRecordingCode>	</SpeciesRecordingCode>		Integer	M
<NetOpening>	</NetOpening>	NOT USED	Float	NU
<Distance>	</Distance>		Integer	O
<WarpLength>	</WarpLength>		Integer	O
<WarpDiameter>	</WarpDiameter>		Integer	O
<DoorSurface>	</DoorSurface>		Float	O
<DoorWeight>	</DoorWeight>		Integer	O
<Buoyancy>	</Buoyancy>		Integer	O
<KiteDimensions>	</KiteDimensions>		Float	O
<WeightGroundRope>	</WeightGroundRope>		Integer	O
<DoorSpread>	</DoorSpread>		Integer	O

<HHRecord>

<HERecord RecordType="HE">

<Quarter>	</Quarter>	Integer	M
<Country>	</Country>	String	M
<Ship>	</Ship>	String	M
<Gear>	</Gear>	String	M
<SweepLength>	</SweepLength>	String	O
<Exceptions>	</Exceptions>	String	O
<DoorType>	</DoorType>	String	O
<StationNo>	</StationNo>	String	O
<HaulNo>	</HaulNo>	Integer	M
<Year>	</Year>	Integer	M
<LatDegrees>	</LatDegrees>	Integer	M
<LatMinutes>	</LatMinutes>	Integer	M
<LonDegrees>	</LonDegrees>	Integer	M
<LonMinutes>	</LonMinutes>	Integer	M
<EastWest>	</EastWest>	String	M
<TowingDirection>	</TowingDirection>	Integer	O
<GroundSpeed>	</GroundSpeed>	Float	O
<SpeedThroughWater>	</SpeedThroughWater>	Float	O
<WingSpread>	</WingSpread>	Integer	O
<SurfaceCurrentDirection>	</SurfaceCurrentDirection>	Integer	O
<SurfaceCurrentSpeed>	</SurfaceCurrentSpeed>	Float	O
<BottomCurrentDirection>	</BottomCurrentDirection>	Integer	O
<BottomCurrentSpeed>	</BottomCurrentSpeed>	Float	O
<WindDirection>	</WindDirection>	Integer	O
<WindSpeed>	</WindSpeed>	Integer	O
<SwellDirection>	</SwellDirection>	Integer	O
<SwellHeight>	</SwellHeight>	Float	O
<NetOpening>	</NetOpening>	Float	O
<LatDecimals>	</LatDecimals>	Integer	M
<LonDecimals>	</LonDecimals>	Integer	M
<FishingStrategy>	</FishingStrategy>	String	O
<HeadRopeDepth>	</HeadRopeDepth>	Integer	M

</HERecord>

<HLRecord RecordType="HL">

<Quarter>	</Quarter>	Integer	M
<Country>	</Country>	String	M
<Ship>	</Ship>	String	M
<Gear>	</Gear>	String	M
<SweepLength>	</SweepLength>	String	O
<Exceptions>	</Exceptions>	String	O
<DoorType>	</DoorType>	String	O
<StationNo>	</StationNo>	String	O
<HaulNo>	</HaulNo>	Integer	M
<Year>	</Year>	Integer	M
<SpeciesCode>	</SpeciesCode>	String	M
<ValidityCode>	</ValidityCode>	Integer	M
<NoHour>	</NoHour>	Integer	O
<CatchWeightHour>	</CatchWeightHour>	Integer	O
<NoMeasured>	</NoMeasured>	Integer	M
<LengthCode>	</LengthCode>	String	M
<LengthClass>	</LengthClass>	Integer	M
<NoAtLength>	</NoAtLength>	Integer	M
<Sex>	</Sex>	String	O
<No>	</No>	Integer	M
<CatchWeight>	</CatchWeight>	Integer	M

</HLRecord>

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</FisheriesRecords>

Last tag marks the end of the fisheries records.

5.2.4 SMALK Records

<SMALKRecords>

<CARecord RecordType="CA">

<Quarter>	</Quarter>	Integer	M
<Country>	</Country>	String	M
<Ship>	</Ship>	String	O
<Gear>	</Gear>	String	O
<SweepLength>	</SweepLength>	String	O
<Exceptions>	</Exceptions>	String	O
<DoorType>	</DoorType>	String	O
<StationNo>	</StationNo>	String	O
<HaulNo>	</HaulNo>	Integer	M
<Year>	</Year>	Integer	M
<SpeciesCode>	</SpeciesCode>	String	M
<AreaSubareaType>	</AreaSubareaType>	Integer	M
<AreaCode>	</AreaCode>	String	M
<LengthCode>	</LengthCode>	String	M
<LengthClass>	</LengthClass>	Integer	M
<Sex>	</Sex>	String	O
<Maturity>	</Maturity>	String	O
<grIdent>	</grIdent>	String	M
<AgeRings>	</AgeRings>	Integer	O
<Number>	</Number>	Integer	M

</CARecord>

.

.

.

</SMALKRecords>

References used in this document

[Working Paper 1998]

International database for acoustic data and biological sampling for surveys in the North Sea and West Of Scotland, Proposal for a database structure and database exchange format, Working Paper, study Group on Baltic Acoustic Data 1998, Hersur project, Ver. 3.0 .

[IBTS Rev. V]

Manual for the international bottom trawl surveys, Revision V, addendum to Ices CM 1996/H:1.

[BITS 1998]

Manual for the Baltic International Trawl Surveys, Updated and agreed during the meeting of the Baltic International Fish survey Working Group, Karlskrona, Sweden, 8.-12. June, 1998 (Appendix II of the: 'Report of the: Baltic International Fish Survey Working Group, Karlskrona, Sweden, 8. -13. June 1998', ICES CM1998/H: 4).

[Requirements Specification for the HERSUR Project, Rev. 1]

'Requirements specification for the HERSUR project, Revision I', DIFRES, Fall 1998

HERSUR/BALTDAT specific lookup tables

Appendix 1.A Sounder/integrator Table, alphanumeric, 2 positions

1	EK500
2	EY500
3	EK400
4	EKS38
5	SARGAN
6	‘FQ-70’ FURUNO
7	EY200
8	
9	
A	BI500
B	SIORS
C	QD
D	QM
E	EKKOANNA
F	BEI
G	EK500

Appendix 1.B Classification Herring/Sprat, numeric, 2 positions

1	Herring/Sprat
2	Maybe Herring/Sprat
3	Probably not Herring/Sprat
4	Mixed

Appendix 1.C Fishing Strategy, alphanumeric, 2 positions

D	Day fishery only
N	Night fishery only
B	Both day and night fishery
1	Trawling on mixed layers
2	Trawling on shoals
3	Shoals hunting
4	Gillnet Fishery
5	Composite Haul

Appendix II MATURITY KEY

MATURITY KEY

<u>1.VIRGIN</u>

Male	Testes very thin translucent ribbon lying along an unbranched blood vessel. No sign of development.
Female	Ovaries small, elongated, whitish, translucent. No sign of development.

<u>2. MATURING</u>

Male	Development has obviously started, colour is progressing towards creamy white and the testes are filling more and more of the body cavity but sperm cannot be extruded with only moderate pressure.
Female	Development has obviously started, eggs are becoming larger and the ovaries are filling more and more of the body cavity but eggs cannot be extruded with only moderate pressure.

<u>3.SPAWNING</u>

Male	Will extrude sperm under moderate pressure to advanced stage of extruding sperm freely with some sperm still in the gonad.
Female	Will extrude eggs under moderate pressure to advanced stage of extruding eggs freely with some eggs still in the gonad.

<u>4. SPENT</u>

Male	Testes shrunken with little sperm in the gonads but often some in the gonoducts which can be extruded under light pressure. Resting condition firm, not translucent, showing no development.
Female	Ovaries shrunken with few residual eggs and much slime. Resting condition, firm, not translucent, showing no development.

<u>5. RESTING</u>

Male	Testes firm, not translucent, showing no development.
Female	Ovaries firm, not translucent, showing no development

ALPHA CODES FOR COUNTRIES AND SHIPS

COUNTRY	ICES CODE	SHIP'S NAME	IYFS CODE
Denmark	DEN	Dana (old)	- DAN
		J.C.Svabo	- JCS
		Dana (new)	- DAN2
		Havfisken	- HAF
		Havkatten	- HAK
Estonia	EST	Koha	- KOH
Finland	FIN		
France	FRA	Thalassa	- THA
		Thalassa (new)	- THA2
		La Perle	- LAP
		Cryos	- CRY
		Gwen Drez	-..GWD
Germany	GFR	Anton Dohrn (old)	- AND
		Anton Dohrn (new)	- AND2
		Solea	- SOL
		Walther Herwig	- WAH
		Walther Herwig III	- WAH3
		Clupea	- CLP
		Eisbär	- EIS
		Ernst Haeckel II	- HAE2
Ireland	IRL	Lough Beltra	- LOB
		Commercial vessel	- COMI
Latvia	LAT 1)	Baltijas Petnieks	- BPE
		Issledovatel Baltiki	- ISB
		Zvezda Baltiki	- ZBA
Lithuania	LTU 1)	Darius	- DAR
Netherlands	NED	Willem Beukelsz	- WIL
		Tridens (old)	- TRI
		Tridens (new)	- TRI2
		Isis	- ISI
		Rose-Marie	- ROS
		Nicolaas Senior	-- KLA
Norway	NOR	G.O.Sars	- GOS
		Johan Hjort (old)	- JOH
		Feiebas	- FEI
		Michael Sars	- MIC

		Eldjarn	- ELD
		Johan Hjort (new)	- JHJ
Poland	POL	Baltica	- BAL
		Birkut	- BIR
Portugal	POR	Noruega	- NOR
Russia	RUS	Monokristal	- MON
		Atlantniro	- ATL
Spain	SPA	Cornide de Saavedra- CDS	
United Kingdom (England and Wales)	ENG	Clione	- CLI
		Ernest Holt	- ERN
		Cirolana	- CIR
		Commercial vessel	- COME
United Kingdom (Scotland)	SCO	Explorer	- EXP
		Scotia (old)	- SCO
		Clupea	- CLU
		Scotia (new)	- SCO2
Sweden	SWE	Thesis	- THE
		Skagerak	- SKA
		Argos	- ARG
		Ancylus	- ACY

Note 1): Country code for Latvia and Lithuania codes refer to the FAO, ISO Alpha 3 code system.1

Appendix IV PRELIMINARY ALPHANUMERIC CODE FOR IYFS / IBTS GEARS

PRELIMINARY ALPHANUMERIC CODE FOR IYFS / IBTS GEARS

DHT	Dutch Herring Trawl	Scotia, Cirolana	
DHT40	40 Feet	Clupea	
DHT45	45 Feet	Willem Beukelsz	
DHT48	48 Feet	Explorer	
DHT63	63 Feet	Tridens	
DHT73	73 Feet	Tridens	
HT	Herring Bottom Trawl	Dana: 3 Winged trawl	
HT120	120 Feet	Dana	
HT180	180 Feet	Anton Dohrn	
VIN	Vinge Trawl	Scotia	
INT	Industrial Trawl	G.O.Sars, Feiebas	
GRT	Granton Trawl	G.O.Sars, Feiebas, Cirolana	
HOB	High Opening Bottom Trawl	Tridens, G.O.Sars	
GOV	Grand Ouverture Verticale	Standard gear for all vessels	
ABD	Aberdeen 48 ft Trawl	Scotia	
COM	Commercial trawl with sprat bag	Irish commercial trawl	
BOX	Boris 'Goshawk' Box Trawl	England	
PHHT	Potuguese High Headline Trawl	Cirolana	
GOVS	Small GOV 20/25	Gwen Drez	
BAKA	Baka Trawl	Cornide de Saavedra	
NCT	Norwegian Campelen Trawl	Noruega	
PS366	Krake	Solea	pelagic
AAL	Aalhopser	Solea	bottom
KAB	Kabeljaubomber	Solea	pelagic
BLACK	Blacksprutte	Solea	pelagic
FOT	Fotö trawl	Argos	pelagic
MAC	Macro 4	Argos	pelagic
RTA	RT/TM	Atlantniro Atlandtida Monokristall	pelagic
WP53	Herring pel. tr.	Baltica	pelagic

Within the gear field the following positions have been reserved for recording various types of rigging:

Position 14-16   Sweep length in m. (Numeric, right justified, zero filled. Spaces for unknown. Code 000 indicates the semi-pelagic rigging, this specification is associated with the GOV.)

Position 17:   Exceptions (B=Bobbins used, D=Double sweeps, space=standard or not known).

Position 18: Door type (P=Polyvalent, V=Vee, F=Flat, K=Karm Waco, space=others or not known).

Further quantitative numeric information on rigging of gear is defined in positions 74-95, in Record Type 1.

NB: This code must still be considered as a preliminary one. More detailed information on the gears used in the past is required before a completely comprehensive coding system can be developed.

Appendix V RECORDED SPECIES CODES

RECORDED SPECIES CODES

NB: 1) Zero catches of a particular species in a haul may be included in or excluded from the file. However, any species deliberately excluded from a subset, or an invalid species for a particular haul, should be included for each haul with a species validity code 0 !!.
2) For species codes see Appendix VI and VII.

RECORDED STANDARD SPECIES LIST CODES (POSITION 65)

0 =	No standard species recorded	
1 =	All (7) standard species recorded	
2 =	Pelagic (3) standard species recorded	1)
3 =	Roundfish (4) standard species recorded	1)
4 =	Individual (1) standard species recorded	2)

RECORDED BY-CATCH SPECIES LIST CODES (POSITION 66)

0 =	No by-catch species recorded	
1 =	Open ended by-catch list - All species, even species complexes	
2 =	Closed by-catch list - All (27) species recorded	
3 =	Closed by-catch list - Gadoid (8) species recorded	1)
4 =	Closed by-catch list - Flatfish (9) species recorded	1)
5 =	Closed by-catch list - Various (10) species recorded	1)

1) For definition see Appendix VI.
2) If this code is applied, zero catches of the species recorded must be recorded in Record Type 2 format.

EXAMPLES OF APPLICATION OF THE SPECIES RECORDING CODE AND CORRESPONDING TREATMENT IN THE ANALYSIS PHASE

1) All species are recorded. Species recording code = 1 1

Comments: All fish species incorporated in Appendix VII are reported. Records for species having zero catches may be omitted, but for species which have deliberately not been counted must be included with validity code 0.

Analysis: Zeroes are generated for a species for which no record exists. Hauls with species validity code 0 are omitted for that species.

2) All standard pelagic species are recorded and no others. Species recording code = 2 0

Comments: The catch of other species than herring sprat and mackerel is not available.

Analysis: Zeroes are generated for a standard pelagic species for which no record exists. For other species a validity code 0 is generated and the haul will thus be omitted.

3) All standard roundfish species and herring are recorded. Species recording code = 1 0

Comments: The catch of other species than cod, haddock, whiting, Norway pout and herring is not available. The non-available standard species in the reference list for code 1 (sprat and mackerel) must be included in the file showing validity code 0. Standard species having zero catches may be omitted from the file.

Analysis: Zeroes are generated for a standard species for which no record exists. For other species a validity code is generated and the haul will thus be omitted.

4) Only one species recorded (e.g. herring).

Two options exist to cope with this example:

Option A. Species recording code = 2 0

Comments: Sprat and mackerel must be recorded with validity code 0. Zero catches of herring may be omitted.

Analysis: As in example 3.

Option B. Species recording code = 4 0

Comments: For each haul a record must be given showing the herring catch, even when it is zero.

Analysis: Species validity code 0 is generated for all other species than the one reported (i.e. herring) and the haul will thus be omitted from the analysis.

Appendix VI SPECIES NAMES AND NODC CODES
FOR STANDARD AND CLOSED BY-CATCH LISTS

SPECIES NAMES AND NODC CODES
FOR STANDARD AND CLOSED BY-CATCH LISTS

GROUP	SPECIES	NODC
Standard Pelagic	Herring	8747010201
	Sprat	8747011701
	Mackerel	8850030302
Standard Roundfish	Cod	8791030402
	Haddock	8791031301
	Whiting	8791031801
	Norway pout	8791031703
By-catch Gadoid	Saithe	8791030901
	Pollack	8791030902
	Pouting	8791031702
	Poor cod	8791031701
	Blue whiting	8791032201
	Hake	8791040105
	Ling	8791031901
	Tusk	8791031101
By-catch Flatfish	Plaice	8857041502
	Dab	8857040904
	Long rough dab	8857040603
	Lemon sole	8857041202
	Witch	8857040502
	Megrim	8857032302
	Turbot	8857030402
	Brill	8857030403
	Halibut	8857041902
	Flounder	8857041402
	Sole	8858010601
By-catch Various	Grey gurnard	8826020601
	Red gurnard	8826020801
	Spurdog	8710010201
	Horse mackerel	8835280103
	Red mullet	8835450202
	Lesser silversmelt	8756010209
	Greater silversmelt	8756010203
	Dragonet	8846010106
	Monkfish	8786010103
	Catfish	8842020103
	Sandeels	8845010000

Appendix VII NODC CODES FOR FISH SPECIES (IN TAXONOMIC ORDER)

NODC CODES FOR FISH SPECIES (IN TAXONOMIC ORDER)

8603010000	Petromyzonidae		
8603010200	Lampetra	8603010217	Lampetra fluviatilis
		8603010218	Lampetra planeri
8603010300	Petromyzon	8603010301	Petromyzon marinus
8606010000	Myxinidae		
8606010200	Myxine	8606010201	Myxine glutinosa
8705010000	Chlamydoselachidae		
8705010100	Chlamydoselach	8705010101	Chlamydoselach anguineus
8705020000	Hexanchidae		
8705020100	Hexanchus	8705020101	Hexanchus Griseus
8707040000	Lamnidae		
8707040200	Cetorhinus	8707040201	Cetorhinus maximus
8707040300	Lamna	8707040302	Lamna nasus
8707040400	Alopias	8707040401	Alopias vulpinus
8707040500	Isurus	8707040501	Isurus oxyrhinchus
8708010000	Scyliorhinidae		
8708010100	Apristurus	8708010103	Apristurus laurussoni
8708010200	Galeus	8708010203	Galeus melastomus
		8708010204	Galeus murinus
8708010300	Scyliorhinus	8708010306	Scyliorhinus caniculus
		8708010307	Scyliorhinus stellaris
8708010700	Pseudotriakis	8708010701	Pseudotriakis microdon
8708020000	Carcharinidae		
8708020100	Galeorhinus	8708020102	Galeorhinus galeus
8708020200	Galeocerdo	8708020201	Galeocerdo cuvier
8708020400	Mustelus	8708020408	Mustelus asterias
		8708020409	Mustelus mustelus
		8708020410	Mustelus punctulatus
8708020600	Prionace	8708020601	Prionace glauca
8708030000	Sphyrnidae		
8708030100	Sphyrna	8708030102	Sphyrna zygaena
		8708030103	Sphyrna lewini
		8708030105	Sphyrna tudes
8710010000	Squalidae		
8710010100	Somniosus	8710010102	Somniosus microcephalus
8710010200	Squalus	8710010201	Squalus acanthias
		8710010202	Squalus blainvillei
8710010300	Centrophorus	8710010301	Centrophorus granulosus
		8710010302	Centrophorus squamosus
		8710010303	Centrophorus uyato
8710010400	Dalatias	8710010401	Dalatias licha
8710010500	Etmopterus	8710010503	Etmopterus princeps
		8710010510	Etmopterus spinax
8710010700	Oxynotus	8710010702	Oxynotus centrina

		8710010703	Oxynotus paradoxus
8710010900	Centroscyllium	8710010901	Centroscyllium fabricii
8710011000	Echinorhinus	8710011001	Echinorhinus brucus
8710011200	Centroscymnus	8710011201	Centroscymnus coelolepis
		8710011202	Centroscymnus crepidater
8710011400	Deania	8710011401	Deania calceus
8710011600	Scymnodon	8710011601	Scymnodon ringens
		8710011602	Scymnodon obscurus
8711010000	Squatinidae		
8711010100	Squatina	8711010103	Squatina squatina
8713030000	Torpedinidae		
8713030100	Torpedo	8713030102	Torpedo nobiliana
		8713030104	Torpedo torpedo
		8713030105	Torpedo marmorata
8713040000	Rajidae		
8713040100	Raja	8713040134	Raja radiata
		8713040138	Raja brachyura
		8713040140	Raja microocellata
		8713040141	Raja montagui
		8713040142	Raja hyperborea
		8713040143	Raja batis
		8713040144	Raja nidarosiensis
		8713040145	Raja oxyrhynchus
		8713040146	Raja fullonica
		8713040147	Raja circularis
		8713040148	Raja naevus
		8713040150	Raja fyllae
		8713040151	Raja alba
		8713040153	Raja lintea
		8713040158	Raja undulata
		8713040159	Raja clavata
8713040800	Bathyraja	8713040801	Bathyraja pallida
		8713040803	Bathyraja spinicauda
8713050000	Dasyatidae		
8713050100	Dasyatis	8713050111	Dasyatis pastinacus
8713070000	Myliobatidae		
8713070200	Myliobatis	8713070204	Myliobatis aquila
8713080000	Mobulidae		
8713080200	Mobula	8713080205	Mobula mobular
8716020000	Chimaeridae		
8716020100	Hydrolagus	8716020103	Hydrolagus mirabilis
8716020200	Chimaera	8716020202	Chimaera monstrosa
8716030000	Rhinochimaeridae		
8716030200	Rhinochimaera	8716030201	Rhinochimaera atlantica
8729010000	Acipenseridae		
8729010100	Acipenser	8729010107	Acipenser sturio
8741010000	Anguillidae		

8741010100	Anguilla	8741010102	Anguilla anguilla
8741050000	Muraenidae		
8741050500	Muraena	8741050505	Muraena helena
8741120000	Congridae		
8741120100	Conger	8741120111	Conger conger
8741150000	Synaphobranchidae		
8741150100	Synaphobranchus	8741150104	Synaphobranchus kaupi
8741200000	Serrivomeridae		
8741200100	Serrivomer	8741200102	Serrivomer beani
		8741200104	Serrivomer parabeani
8741210000	Nemichthyidae		
8741210100	Avocettina	8741210102	Avocettina infans
8741210200	Nemichthys	8741210202	Nemichthys scolopaceus
8743030000	Notacanthidae		
8743030200	Polyacanthonotus	8743030204	Polyacanthonotus rissoanus
8743030300	Notocanthus	8743030301	Notocanthus chemnitzii
		8743030302	Notocanthus bonaparti
8747010000	Clupeidae		
8747010100	Alosa	8747010107	Alosa alosa
		8747010109	Alosa fallax
8747010200	Clupea	8747010201	Clupea harengus
8747011700	Sprattus	8747011701	Sprattus sprattus
8747012200	Sardina	8747012201	Sardina pilchardus
8747020000	Engraulidae		
8747020100	Engraulis	8747020104	Engraulis encrasicolus
8755010000	Salmonidae		
8755010100	Coregonus	8755010115	Coregonus lavaretus
		8755010116	Coregonus albula
8755010200	Oncorhynchus	8755010201	Oncorhynchus gorbuscha
		8755010202	Oncorhynchus keta
8755010300	Salmo	8755010302	Salmo gairdneri
		8755010305	Salmo salar
		8755010306	Salmo trutta
8755010400	Salvelinus	8755010402	Salvelinus alpinus
		8755010404	Salvelinus fontinalis
8755010700	Thymallus	8755010704	Thymallus thymallus
8755010800	Hucho	8755010801	Hucho hucho
8755030000	Osmeridae		
8755030200	Mallotus	8755030201	Mallotus villosus
8755030300	Osmerus	8755030301	Osmerus eperlanus

8756010000	Argentinidae		
8756010200	Argentina	8756010203	Argentina silus
		8756010209	Argentina sphyraena
8758010000	Esocidae		
8758010100	Esox	8758010101	Esox lucius
8758020000	Umbridae		
8758020100	Umbra	8758020101	Umbra pygmaea
		8758020103	Umbra krameri
8759010000	Gonostomatidae		
8759010500	Maurolicus	8759010501	Maurolicus muelleri
8759020000	Sternoptychidae		
8759020100	Argyropelecus	8759020107	Argyropelecus olfersii
8760010000	Alepocephalidae		
8760010300	Alepocephalus	8760010302	Alepocephalus rostratus
		8760010305	Alepocephalus bairdi
8760010700	Conocara	8760010704	Conocara salmonea
8762070000	Paralepididae		
8762070200	Notolepis	8762070201	Notolepis rissoi
8762070400	Paralepis	8762070402	Paralepis coregonoides
8762140000	Myctophidae		
8762140300	Lampanyctus	8762140317	Lampanyctus crocodilus
8784010000	Gobiesocidae		
8784010600	Lepadogaster	8784010601	Lepadogaster candollei
		8784010603	Lepadogaster lepadogaster
8784010700	Diplecogaster	8784010701	Diplecogaster bimaculata
8784010800	Apletodon	8784010801	Apletodon microcephalus
8786010000	Lophiidae		
8786010100	Lophius	8786010103	Lophius piscatorius
		8786010104	Lophius budegassa
8787020000	Antennariidae		
8787020100	Histrio	8787020101	Histrio histrio
8787020200	Antennarius	8787020203	Antennarius radiosus
8788030000	Himantolophiidae		
8788030200	Himantolophus	8788030201	Himantolophus groenlandicus
8788080000	Ceratiidae		
8788080100	Ceratias	8788080101	Ceratias holboelli
8788100000	Linophrynidae		
8788100100	Linophryne	8788100102	Linophryne lucifer
8791010000	Moridae		
8791010100	Antimora	8791010101	Antimora rostrata
8791010200	Laemonema	8791010203	Laemonema latifrons
8791010400	Mora	8791010401	Mora moro
8791010500	Lepidion	8791010501	Lepidion eques

8791010600	Halargyreus	8791010601	Halargyreus affinis
8791030000	Gadidae		
8791030200	Boreogadus	8791030201	Boreogadus saida
8791030400	Gadus	8791030402	Gadus morhua
8791030800	Lota	8791030801	Lota lota
8791030900	Pollachius	8791030901	Pollachius virens
		8791030902	Pollachius pollachius
8791031100	Brosme	8791031101	Brosme brosme
8791031300	Melanogrammus	8791031301	Melanogrammus aeglefinus
8791031500	Rhinonemus	8791031501	Rhinonemus cimbrius
8791031600	Phycis	8791031602	Phycis blennoides
8791031700	Trisopterus	8791031701	Trisopterus minutus
		8791031702	Trisopterus luscus
		8791031703	Trisopterus esmarki
8791031800	Merlangius	8791031801	Merlangius merlangus
8791031900	Molva	8791031901	Molva molva
		8791031902	Molva dipterygia
		8791031904	Molva macropthalma
8791032000	Gaidropsurus	8791032001	Gaidropsurus vulgaris
		8791032002	Gaidropsurus mediterraneus
8791032100	Gadiculus	8791032101	Gadiculus argenteus
8791032200	Micromesistius	8791032201	Micromesistius poutassou
8791032300	Raniceps	8791032301	Raniceps raninus
8791032400	Ciliata	8791032401	Ciliata mustela
		8791032402	Ciliata septentrionalis
8791032500	Onogadus	8791032501	Onogadus argenteus
8791032600	Antonogadus	8791032601	Antonogadus macropthalmus
8791040000	Merluccidae		
8791040100	Merluccius	8791040105	Merluccius merluccius
8792010000	Ophidiidae		
8792010600	Ophidion	8792010607	Ophidion barbatum
8792020000	Carapidae		
8792020200	Echiodon	8792020202	Echiodon drummondi
8793010000	Zoarcidae		
8793010500	Lycenchelys	8793010513	Lycenchelys sarsi
8793010700	Lycodes	8793010724	Lycodes vahlii
		8793010725	Lycodes esmarkii
8793012000	Zoarces	8793012001	Zoarces viviparus
8794010000	Macrouridae		
8794010100	Coryphaenoides	8794010117	Coryphaenoides rupestris
8794010400	Coelorinchus	8794010405	Coelorinchus coelorinchus
8794010600	Malacocephalus	8794010601	Malacocephalus laevis
8794010800	Nezumia	8794010801	Nezumia aequalis
8794011500	Trachyrhynchus	8794011501	Trachyrhynchus trachyrhynchus
		8794011502	Trachyrhynchus murrayi
8794011600	Macrourus	8794011601	Macrourus berglax
8803010000	Exocoetidae		
8803010100	Cypselurus	8803010101	Cypselurus heterurus
		8803010106	Cypselurus pinnatibarbatus
8803010500	Danichthys	8803010501	Danichthys rondeletii

8803010700	Exocoetus	8803010701	Exocoetus obtusirostris
8803020000	Belonidae		
8803020500	Belone	8803020502	Belone belone
8803030000	Scomberesocidae	8803030200	Scomberesox
		8803030201	Scomberesox saurus
8805020000	Atherinidae		
8805021000	Atherina	8805021002	Atherina boyeri
		8805021003	Atherina presbyter
8810010000	Diretmidae		
8810010100	Diretmus	8810010101	Diretmus argenteus
8810020000	Trachichthyidae		
8810020100	Gephyroberyx	8810020101	Gephyroberyx darwini
8810020200	Hoplostethus	8810020201	Hoplostethus atlanticus
		8810020202	Hoplostethus mediterraneus
8810050000	Berycidae		
8810050100	Beryx	8810050101	Beryx decadactylus
		8810050102	Beryx splendens
8811030000	Zeidae		
8811030300	Zeus	8811030301	Zeus faber
8811060000	Caproidae		
8811060300	Capros	8811060301	Capros aper
8813010000	Lampridae		
8813010100	Lampris	8813010102	Lampris guttatus
8815020000	Trachipteridae		
8815020100	Trachipterus	8815020102	Trachipterus arcticus
8815030000	Regalecidae		
8815030100	Regalecus	8815030101	Regalecus glesne
8818010000	Gasterosteidae		
8818010100	Gasterosteus	8818010101	Gasterosteus aculeatus
8818010200	Pungitius	8818010201	Pungitius pungitius
8818010500	Spinachia	8818010501	Spinachia spinachia
8819030000	Macrorhamphosidae		
8819030100	Macrorhamphosus	8819030101	Macrorhamphosus scolopax
8820020000	Syngnathidae		
8820020100	Syngnathus	8820020119	Syngnathus rostellatus
		8820020120	Syngnathus acus
		8820020123	Syngnathus typhle
8820020200	Hippocampus	8820020209	Hippocampus hippocampus
		8820020210	Hippocampus ramulosus
8820022100	Entelurus	8820022101	Entelurus aequoreus
8820022200	Nerophis	8820022201	Nerophis lumbriciformis
		8820022202	Nerophis ophidion

8826010000	Scorpaenidae		
8826010100	Sebastes	8826010139	Sebastes marinus
		8826010151	Sebastes mentella
		8826010175	Sebastes viviparus
8826010300	Helicolenus	8826010301	Helicolenus dactylopterus
8826010600	Scorpaena	8826010628	Scorpaena scropha
		8826010629	Scorpaena porcus
8826011100	Trachyscorpia	8826011101	Trachyscorpia cristulata
8826020000	Triglidae		
8826020300	Peristedion	8826020316	Peristedion cataphractum
8826020500	Trigla	8826020501	Trigla lucerna
		8826020503	Trigla lyra
8826020600	Eutrigla	8826020601	Eutrigla gurnardus
8826020700	Trigloporus	8826020701	Trigloporus lastoviza
8826020800	Aspitrigla	8826020801	Aspitrigla cuculus
		8826020802	Aspitrigla obscura
8831010000	Icelidae		
8831010100	Icelus	8831010101	Icelus bicornis
8831020000	Cottidae		
8831020300	Artediellus	8831020308	Artediellus europaeus
8831020800	Cottus	8831020825	Cottus gobio
8831022200	Myoxocephalus	8831022205	Myoxocephalus quadricornis
		8831022207	Myoxocephalus scorpius
8831023800	Triglops	8831023807	Triglops murrayi
8831024600	Taurulus	8831024601	Taurulus bubalis
		8831024602	Taurulus lilljeborgi
8831060000	Cottunculidae		
8831060100	Cottunculus	8831060101	Cottunculus microps
8831080000	Agonidae		
8831080800	Agonus	8831080801	Agonus decagonus
		8831080803	Agonus cataphractus
8831090000	Cyclopteridae		
8831090200	Careproctus	8831090232	Careproctus longipinnis
		8831090233	Careproctus reinhardi
8831090800	Liparis	8831090828	Liparis liparis
		8831090831	Liparis montagui
8831091500	Cyclopterus	8831091501	Cyclopterus lumpus
8835020000	Serranidae		
8835020100	Morone	8835020102	Morone saxatilis
8835020400	Epinephelus	8835020435	Epinephelus guaza
8835022300	Serranus	8835022316	Serranus cabrilla
8835022800	Polyprion	8835022801	Polyprion americanus
8835160000	Centrarchidae		
8835160200	Ambloplites	8835160201	Ambloplites rupestris
8835160500	Lepomis	8835160505	Lepomis gibbosus
8835160600	Micropterus	8835160601	Micropterus dolomieui
		8835160602	Micropterus salmoides
8835180000	Apogonidae		
8835180400	Epigonus	8835180403	Epigonus telescopus

8835181200	Rhectogramma	8835181201	Rhectogramma sherborni
8835270000	Echeneidae		
8835270100	Remora	8835270103	Remora remora
8835280000	Carangidae		
8835280100	Trachurus	8835280103	Trachurus trachurus
		8835280105	Trachurus mediterraneus
		8835280106	Trachurus picturatus
8835280800	Seriola	8835280801	Seriola dumerili
8835280900	Trachinotus	8835280911	Trachinotus ovatus
8835281500	Naucrates	8835281501	Naucrates ductor
8835282400	Lichia	8835282401	Lichia amia
8835330000	Caristiidae		
8835330100	Caristius	8835330101	Caristius macropus
8835430000	Sparidae		
8835431000	Dentex	8835431002	Dentex macropthalmus
		8835431005	Dentex dentex
8835430600	Pagrus	8835430601	Pagrus pagrus
8835430800	Pagellus	8835430801	Pagellus bogaraveo
		8835430802	Pagellus acarne
		8835430804	Pagellus erythrinus
8835430900	Boops	8835430901	Boops boops
8835431100	Sparus	8835431101	Sparus aurata
		8835431102	Sparus pagurus
8835431200	Spondyliosoma	8835431201	Spondyliosoma cantharus
8835440000	Sciaenidae		
8835441100	Umbrina	8835441107	Umbrina canariensis
		8835441108	Umbrina cirrosa
8835442700	Argyrosomus	8835442701	Argyrosomus regium
8835450000	Mullidae		
8835450200	Mullus	8835450202	Mullus surmuletus
		8835450203	Mullus barbatus
8835700000	Cepolidae		
8835700100	Cepola	8835700102	Cepola rubescens
8835710000	Bramidae		
8835710100	Brama	8835710102	Brama brama
8835710300	Pterycombus	8835710301	Pterycombus brama
8835710400	Taractes	8835710403	Taractes asper
8835710700	Taracticthys	8835710701	Taractichthys longipinnis
8835720000	Percichthyidae		
8835720100	Dicentrarchus	8835720101	Dicentrarchus labrax
		8835720102	Dicentrarchus punctatus
8836010000	Mugilidae		
8836010100	Mugil	8836010101	Mugil cephalus
8836010700	Chelon	8836010704	Chelon labrosus
8836010900	Liza	8836010901	Liza ramada
		8836010902	Liza auratus
8839010000	Labridae		

8839012300	Coris	8839012306	Coris julis
8839013300	Crenilabrus	8839013301	Crenilabrus melops
8839013400	Centrolabrus	8839013401	Centrolabrus exoletus
8839013500	Ctenolabrus	8839013501	Ctenolabrus rupestris
8839013600	Labrus	8839013603	Labrus berggylta
		8839013605	Labrus mixtus
8839013700	Acantholabrus	8839013701	Acantholabrus palloni
8840060000	Trachinidae		
8840060100	Trachinus	8840060101	Trachinus vipera
		8840060102	Trachinus draco
8842010000	Blenniidae		
8842010100	Blennius	8842010104	Blennius ocellaris
		8842010110	Blennius gattorugine
		8842010115	Blennius pholis
8842012400	Coryphoblennius	8842012401	Coryphoblennius galerita
8842020000	Anarhichadidae		
8842020100	Anarhichas	8842020102	Anarhichas denticulatus
		8842020103	Anarhichas lupus
		8842020104	Anarhichas minor
8842120000	Stichaeidae		
8842120500	Chirolophis	8842120505	Chirolophis ascanii
8842120900	Lumpenus	8842120905	Lumpenus lampretaeformis
8842121800	Leptoclinus	8842121801	Leptoclinus maculatus
8842130000	Pholididae		
8842130200	Pholis	8842130209	Pholis gunnellus
8845010000	Ammodytidae		
8845010100	Ammodytes	8845010105	Ammodytes tobianus
		8845010106	Ammodytes marinus
8845010200	Gymnammodytes	8845010201	Gymnammodytes semisquamatus
8845010300	Hyperoplus	8845010301	Hyperoplus lanceolatus
		8845010302	Hyperoplus immaculatus
8846010000	Callionymidae		
8846010100	Callionymus	8846010106	Callionymus lyra
		8846010107	Callionymus maculatus
		8846010120	Callionymus reticulatus
8847010000	Gobiidae		
8847011300	Gobius	8847011304	Gobius auratus
		8847011307	Gobius cobitis
		8847011308	Gobius cruentatus
		8847011316	Gobius niger
		8847011320	Gobius paganellus
		8847011325	Gobius gasteveni
8847014900	Crystallogobius	8847014901	Crystallogobius linearis
8847015000	Gobiusculus	8847015001	Gobiusculus flavescens
8847015100	Pomatoschistus	8847015101	Pomatoschistus minutus
		8847015102	Pomatoschistus pictus
		8847015103	Pomatoschistus microps
		8847015104	Pomatoschistus norvegicus
8847016500	Lebetus	8847016501	Lebetus orca

		8847016502	Lebetus guilleti
8847016600	Aphia	8847016601	Aphia minuta
8847016700	Lesueurigobius	8847016702	Lesueurigobius friesii
8847016800	Buenia	8847016802	Buenia jeffreysii
8847016900	Thorogobius	8847016901	Thorogobius ephippiatus
8850010000	Gempylidae		
8850010400	Ruvettus	8850010401	Ruvettus pretiosus
8850010700	Nesarchus	8850010701	Nesarchus nasutus
8850020000	Trichiuridae		
8850020100	Benthodesmus	8850020101	Benthodesmus simonyi
8850020200	Trichiurus	8850020201	Trichiurus lepturus
8850020300	Aphanopus	8850020301	Aphanopus carbo
8850020400	Lepidopus	8850020401	Lepidopus caudatus
8850030000	Scombridae		
8850030100	Euthynnus	8850030101	Euthynnus pelamis
		8850030105	Euthynnus quadripunctatus
8850030200	Sarda	8850030202	Sarda sarda
8850030300	Scomber	8850030301	Scomber colias
		8850030302	Scomber scombrus
8850030400	Thunnus	8850030401	Thunnus alalunga
		8850030402	Thunnus thynnus
		8850030403	Thunnus albacares
		8850030405	Thunnus obesus
8850030700	Auxis	8850030701	Auxis rochei
		8850030702	Auxis thazard
8850031200	Orcynopsis	8850031201	Orcynopsis unicolor
8850040000	Xiphiidae		
8850040100	Xiphias	8850040101	Xiphias gladius
8850050000	Luvaridae		
8850050100	Luvarus	8850050101	Luvarus imperialis
8850060000	Istiophoridae		
8850060100	Istiophorus	8850060101	Istiophorus platypterus
8850060300	Tetrapterus	8850060301	Tetrapterus albidus
8851010000	Centrolophidae		
8851010200	Hyperoglyphe	8851010201	Hyperoglyphe perciforma
8851010300	Centrolophus	8851010301	Centrolophus niger
		8851010302	Centrolophus medusophagus
8851020000	Nomeidae		
8851020200	Cubiceps	8851020203	Cubiceps gracilis
8851030000	Stromateidae		
8857030000	Bothidae		
8857030400	Scophthalmus	8857030402	Scophthalmus maximus
		8857030403	Scophthalmus rhombus
8857031700	Arnoglossus	8857031702	Arnoglossus laterna
		8857031703	Arnoglossus imperialis
		8857031706	Arnoglossus thori
8857032100	Zeugopterus	8857032101	Zeugopterus punctatus

8857032200	Phrynorhombus	8857032201	Phrynorhombus norvegicus
		8857032202	Phrynorhombus regius
8857032300	Lepidorhombus	8857032301	Lepidorhombus boscii
		8857032302	Lepidorhombus whiffiagonis
8857040000	Pleuronectidae		
8857040500	Glyptocephalus	8857040502	Glyptocephalus cynoglossus
8857040600	Hippoglossoides	8857040603	Hippoglossoides platessoides
8857040900	Limanda	8857040904	Limanda limanda
8857041200	Microstomus	8857041202	Microstomus kitt
8857041400	Platichthys	8857041402	Platichthys flesus
8857041500	Pleuronectes	8857041502	Pleuronectes platessa
8857041800	Reinhardtius	8857041801	Reinhardtius hippoglossoides
8857041900	Hippoglossus	8857041902	Hippoglossus hippoglossus
8858010000	Soleidae		
8858010600	Solea	8858010601	Solea solea
		8858010610	Solea lascaris
8858010800	Buglossidium	8858010801	Buglossidium luteum
8858010900	Microchirus	8858010902	Microchirus azevia
		8858010903	Microchirus variegatus
8858011000	Bathysolea	8858011001	Bathysolea profundicola
8858011100	Dicologlossa	8858011101	Dicologlossa cuneata
8858020000	Cynoglossidae		
8858020200	Cynoglossus	8858020201	Cynoglossus browni
8860020000	Balistidae		
8860020200	Balistes	8860020205	Balistes carolinensis
8860020500	Canthidermis	8860020501	Canthidermis maculatus
8861010000	Tetradontidae		
8861010100	Lagocephalus	8861010102	Lagocephalus lagocephalus
8861040000	Molidae		
8861040100	Mola	8861040101	Mola mola
8861040200	Ranzania	8861040201	Ranzania laevis

Baltic Species

3734030201	AURELIA AURITA
5704020401	SEPIETTA OWENIANA
5706010401	ALLOTEUTHIS SUBULATA
6188030110	CANCER PAGURUS
8603010000	PETROMYZINIDAE
8603010217	LAMPETRA FLUVIATILIS
8603010301	PETROMYZON MARINUS
8606010201	MYXINE GLUTINOSA
8710010201	SQUALUS ACANTHIAS
8713040134	RAJA RADIATA
8741010102	ANGUILLA ANGUILLA
8747010000	CLUPEIDAE
8747010109	ALOSA FALLAX
8747010201	CLUPEA HARENGUS
8747011701	SPRATTUS SPRATTUS
8747012201	SARDINA PILCHARDUS
8747020104	ENGRAULIS ENCRASICOLUS
8755010115	COREGONUS OXYRINCHUS / C. LAVARETUS
8755010305	SALMO SALAR
8755010306	SALMO TRUTTA
8755030301	OSMERUS EPELANUS
8756010237	ARGENTINA SPYRAENA
8759010501	MAUROLICUS MUELLERI
8776014401	RUTILUS RUTILUS
8791030402	GADUS MORRHUA
8791030901	POLLACHIUS VIRENS
8791031301	MELANOGRAMMUS AEGLEFINUS
8791031501	RHINONEMUS CIMBRIUS
8791031701	TRISOPTERUS MINUTUS
8791031703	TRISOPTERUS ESMARKI
8791031801	MERLANGIUS MERLANGIUS
8791032201	MICROMESTISTIUS POTASSOU
8791040105	MERLUCCIUS MERLUCCIUS
8793010000	ZOARCIDAE
8793010724	LYCODES VAHLII
8793012001	ZOARCES VIVIPARUS
8803020502	BELONE BELONE
8818010101	GASTEROSTEUS ACULEATUS
8818010201	SPINACHIA SPINACHIA
8820020000	SYNGNATHIDAE
8820020119	SYNGNATUS ROSTELLATUS
8820020120	SYNGNATUS ACUS
8820020123	SYNGNATUS TYPHLE
8820022101	ENTELURUS AEQUOREUS
8826020601	EUTRIGLA GURNARDUS
8831020825	COTTUS GOBIO
8831022205	MYOXOCEPHALUS QUADRICORNIS
8831022207	MYOXOCEPHALUS SCORPIUS
8831024601	TAURULUS BUBALIS
8831080803	AGONUS CATAPHRACTUS
8831090828	LIPARIS LIPARIS
8831091501	CYCLOPTERUS LUMPUS

8835020101	DICETRARCHUS LABRAX
8835200202	PERCA FLUVIATILIS
8835200403	STIZOSTEDION LUCIOPERCA
8835280103	TRACHURUS TRACHURUS
8835450202	MULLUS SURMULETUS
8839013501	CTENOLABRUS RUPESTRIS
8840060102	TRACHINUS DRACO
8842120905	LUMPENUS LAMPRETAEFORMIS
8842130209	PHOLIS GUNELLUS
8845010000	AMMODYTIDAE
8845010105	AMMODYTES TOBIANUS (LANCEA)
8845010301	HYPEROPLUS LANCEOLATUS
8846010106	CALLIONYMUS LYRA
8846010107	CALLIONYMUS MACULATUS
8847010000	GOBIIDAE
8847015101	POMATOSCHISTUS MINUTUS
8847015103	POMATOSCHISTUS MICROPS
8847016701	LESUEURIGOBIUS FRIESSII
8850030302	SCOMBER SCOMBRUS
8857030402	SCOPHTHALMUS MAXIMUS
8857030403	SCOPHTHALMUS RHOMBUS
8857031702	ARNOGLOSSUS LATERNA
8857040603	HIPPOGLOSSOIDES PLATESSOIDES
8857040904	LIMANDA LIMANDA
8857041202	MICROSTOMUS KITT
8857041402	PLATICHTHYS FLESUS
8857041502	PLEURONECTES PLATESSA
8858010601	SOLEA SOLEA
8858010801	BUGLOSSIDIUM LUTEUM

SPECIES VALIDITY CODE	
0 = INVALID INFORMATION	Information lost.
1 = VALID INFORMATION	No per hour and total length composition recorded; applies also when No per hour is zero.
2 = PARTLY VALID INFORMATION	Refers to haul validity code P; only valid for fish over 20 cm, because no liner has been used; applies also when No per hour is zero.
3 = LENGTH COMPOSITION INCOMPLETE	Only part of the catch has been measured.
4 = TOTAL NO PER HOUR ONLY	Catch sampled for No per hour only; no length measurements.
9 = VALID INFORMATION AVAILABLE BUT NOT RECORDED ON THE FILE	Data not processed on the file.

Appendix IX FIELD SPECIFICATIONS (XML)

FIELD SPECIFICATIONS (XML)

In this appendix is give a description of the fields in the XML file. The fields are listed as they come in the records (when a field is in more records it only appears the first time.

Cruise Info

Field name: Record Type

Length 2

Description Contains description of record type, for identification.

Value(s) Fixed values dependent on recordtype.

Record type	**Values**
Cruise Info record	CI
Sa record	SA
Type1 Haul Information	HH
Type 1a Extended Haulinfomation	HE
Type 2 Length Freq. distribution	HL
Type 4 Size-maturity-age-length keys	CA

Field name: Country

Length 3

Description Country data belongs to

Field Value(s) See appendix III

Field name: Ship

Length 4

Description: Ship from which data has been collected from

Value(s) See appendix III

Field name CruiseNo

Length 3

Description National coding system

Value(s)

Field name Year

Length: 4

Description: The Year in which data was collected

Value(s):

Field name		DateStart
	Length:	8
	Description:	Date for cruise start
	Value(s):	
Field name:		DateEnd
	Length	8
	Description	Date cruise ended
	Value(s)	
Field name:		UpperRightCornerLatitude
	Length	8
	Description	Latitude of upper right corner of a square covering the entire area for the survey
	Value(s)	
Field name:		UpperRightCornerLongitude
	Length	8
	Description	Longitude of upper right corner of Square covering the entire area for the Survey
	Value(s)	
Field name:		LowerLeftCornerLatitude
	Length	8
	Description	Latitude of lower right corner of a square covering the entire area for the survey
	Value(s)	
Field name:		LowerLeftCornerLongitude
	Length	8
	Description	Longitude of lower right corner of Square covering the entire area for the Survey
	Value(s)	
Field name:		AcousticContactFirstName
	Length	30
	Description	The firstname of the contactperson on the acoustic data of this survey
	Value(s)	
Field name:		AcousticContactLastName
	Length	30
	Description	The lastname of the contactperson on the acoustic data of this survey
	Value(s)	

Field name: AcousticContactEmail

Length 60

Description The email address of the contactperson on the acoustic data of this survey

Value(s)

Field name: FisheriesContactFirstName

Length 30

Description The firstname of the contactperson on the fisheries data of this survey

Value(s)

Field name: FisheriesContactLastName

Length 30

Description The lastname of the contactperson on the fisheries data of this survey

Value(s)

Field name: FisheriesContactEmail

Length 60

Description The emailaddress of the contactperson on the fisheries data of this survey

Value(s)

Field name: Sounder

Length 2

Description Sounder/integrator used in this survey

VALUE(S)

Sa record

FIELD NAME: Date

Length 4

Description Date the data of the record was collected

Value(s)

Field name: StartTime

Length 6

Description Time the collection of data to the record started

Value(s)

Field name: EndTime

Length 6

Description End time for the collection of data to the record

Value(s)

Field name: LogCounter

Length 6 (7) 5 + 1 decimalvalue (.)

Description Number of logcounts

Value(s)

Field name:		TransducerDepth	
	Length	4 (5)	3 + 1 decimalvalue(.)
	Description	Position of transducer below seasurface	
	Value(s)		

Field name:		TransducerNumber	
	Length	1	
	Description	What number of transducer was used	
	Value(s)	0-9	If more than one transducer is in use

Field name:		TransducerFrequency	
	Length	4 (5)	3 + 1 decimal (.)
	Description	Frequency used by current sounder	
	Value(s)	In kHz	

Field name:			
	Length	DistanceTimePing	
	Description	Field states whether sampling interval is given by distance, time or pinginterval	
	Value(s)	D,T,P	

Field name:		SamplingInterval	
	Length	6 (7)	5 + 1 decimal (.)
	Description	States at which rate data is sampled	
	Value(s)		

Field name:		StartLatitude	
	Length	8	
	Description	States the position given when sampling was started	
	Value(s)	±DDMMSSS	Degrees Minutes Thousands of a minute

Field name:		StartLongitude	
	Length	8	
	Description	States the position given when sampling was started	
	Value(s)	±DDMMSSS	Degrees Minutes Thousands of a minute

Field name:		EndLatitude	
	Length	8	
	Description	States the position given when sampling was ended	
	Value(s)	±DDMMSSS	Degrees Minutes Thousands of a minute

Field name:		EndLongitude	
	Length	8	
	Description	States the position given when sampling was ended	
	Value(s)	±DDMMSSS	Degrees Minutes Thousands of a minute
Field name:		MeanDepth	
	Length	4	
	Description	Mean depth in metres below seasurface	
	Value(s)		
Field name:		SpeciesCode	
	Length	10	
	Description		
	Value(s)	See Appendix VII	
Field name:		Sa	
	Length	10 (11)	5 + 5 decimals (.)
	Description	Integrated sa value pr. layer	
	Value(s)		
Field name:		SpeciesDepth	
	Length	4	
	Description	Mean depth of the species below sea surface	
	Value(s)		
Field name:		LayerTop	
	Length	4 (5)	3 + 1 decimal (.)
	Description	Top of the layer integrated NOTE: When negative measured from the bottom (bottomlayer)	
	Value(s)		
Field name:		LayerThickness	
	Length	4 (5)	3 + 1 decimal (.)
	Description	Thickness of the layer in which is integrated	
	Value(s)		
Field name:		Classification	
	Length	2	
	Description	See Appendix IB	
	Value(s)		
Field name:		HaulRef	
	Length	4	
	Description	1: Genuine reference to haul 2: Reference to ICES Square	0+ 3 numeric 4 alphanumeric
	Value(s)		

HH record

Field name:		Month
	Length	2
	Description	
	Value(s)	1-12
Field name:		Day
	Length	2
	Description	
	Value(s)	1-28/29/30/31
Field name:		Timeshot
	Length	4
	Description	
	Value(s)	1-2400
Field name:		HaulDuration
	Length	3
	Description	
	Value(s)	
Field name:		DayNight
	Length	1
	Description	
	Value(s)	D/N
Field name:		LatDegrees
	Length	2
	Description	
	Value(s)	
Field name:		LatMinutes
	Length	2
	Description	
	Value(s)	
Field name:		LonDegrees
	Length	2
	Description	
	Value(s)	
Field name:		LonMinutes
	Length	2
	Description	
	Value(s)	
Field name:		EastWest
	Length	1
	Description	
	Value(s)	E/W
Field name:		Depth
	Length	3
	Description	Depth below sea surface
	Value(s)	
Field name:		HaulValidity
	Length	1
	Description	
	Value(s)	I/P/V

Field name:		HydrographicStationNumber	
	Length	8	
	Description		
	Value(s)		
Field name:		SpeciesRecordingCode	
	Length	2	
	Description	See appendix V	
	Value(s)		
Field name:		NetOpening	
	Length	4 (5)	3 + 1 decimal (.)
	Description		THIS IS ***NOT*** USED IN THE HH RECORD ***ONLY IN HE***
	Value(s)		
Field name:		Distance	
	Length	4 (5)	3 +1 decimal (.)
	Description	Distance towed over ground	
	Value(s)		
Field name:		WarpLength	
	Length	3	
	Description		
	Value(s)		
Field name:		WarpDiameter	
	Length	2	
	Description		
	Value(s)		
Field name:		DoorSurface	
	Length	3 (4)	2 + 1 decimal (.)
	Description		
	Value(s)		
Field name:		DoorWeight	
	Length	4	
	Description		
	Value(s)		
Field name:		Buoyancy	
	Length	4	
	Description		
	Value(s)		
Field name:		KiteDimensions	
	Length	2 (3)	1 + 1 decimal (.)
	Description		
	Value(s)		
Field name:		WeightGroundRope	
	Length	4	
	Description		
	Value(s)		
Field name:		DoorSpread	
	Length	3	
	Description		
	Value(s)		

HE record

Field name: TowingDirection
Length 3
Description Direction in degrees
Value(s)

Field name: GroundSpeed
Length 2 (3) 1 + 1 decimal (.)
Description Trawl speed over ground
Value(s)

Field name: SpeedThroughWater
Length 2 (3) 1 + 1 decimal (.)
Description Trawl speed through water
Value(s)

Field name: WingSpread
Length 2
Description
Value(s)

Field name: SurfaceCurrentDirection
Length 3
Description In degrees
Value(s)

Field name: SurfaceCurrentSpeed
Length 3 (4) 2 + 1 decimal (‘)
Description
Value(s)

Field name: BottomCurrentDirection
Length 3
Description In degrees
Value(s)

Field name: BottomCurrentSpeed
Length 3 (4) 2 + 1 decimal (.)
Description
Value(s)

Field name: WindDirection
Length 3
Description
Value(s)

Field name: WindSpeed
Length 3
Description Meters pr.second
Value(s)

Field name: SwellDirection
Length 3
Description
Value(s)

Field name: SwellHeight
Length 3 (4) 2 + 1 decimal (.)
Description
Value(s)

Field name:		LatDecimals	
	Length	3	
	Description	Shooting Position (belongs to HH values)	
	Value(s)		
Field name:		LonDecimals	
	Length	3	
	Description	Shooting Position (belongs to HH values)	
	Value(s)		
Field name:		FishingStrategy	
	Length	2	
	Description	See Appendix I	Example: D5 equals Day Composite Haul
	Value(s)		
Field name:		HeadRopeDepth	
	Length	3	
	Description		
	Value(s)		

HL record

Field name:		ValidityCode	
	Length	2	
	Description	See Appendix VIII	
	Value(s)		
Field name:		NoHour	
	Length	7	
	Description	Total number of species/length class	
	Value(s)		
Field name:		CatchWeightHour	
	Length	5	
	Description	Catch weight / hour / species /length class	
	Value(s)	In 100 grams	
Field name:		NoMeasured	
	Length	3	
	Description	Actual number measured / species / length class	
	Value(s)		
Field name:		LengthCode	
	Length	1	
	Description	.,0,1,5,9	**0.1 CM = .** 0.5 cm = 0 1 cm = 1 2 cm = 2 5 cm = 5
	Value(s)		
Field name:		LengthClass	
	Length	3	
	Description		
	Value(s)		

Field name:		NoAtLength	
	Length	6	
	Description	Estimated number / species / length class	
	Value(s)		
Field name:		Sex	
	Length	1	
	Description	F = Female, M = Male	
	Value(s)		
Field name:		No	
	Length	7	
	Description	Either the actual number caught or an estimation of actual number caught / species/ length class	
	Value(s)		
Field name:		CatchWeight	
	Length	6	
	Description	Either the actual weight or an estimated total catchweight/ species /length class	
	Value(s)	In 100 g	

CA record

Field name:		AreaSubAreaType	
	Length	2	
	Description		
	Value(s)	00-03	ICES statistical rectangles = 0 Four statistical rectangles = 1 Standard NS RoundFish Areas = 2 Herring sampling areas =3
		20-32	ICES Baltic Subdivision Areas
Field name:		AreaCode	
	Length	4	
	Description		
	Value(s)		
Field name:		Maturity	
	Length	1	
	Description	See Appendix II	
	Value(s)	1-5	
Field name:		grIdent	
	Length	1	
	Description		
	Value(s)	+ or space	
Field name:		AgeRings	
	Length	2	
	Description		
	Value(s)	0-99	
Field name:		Number	
	Length	3	
	Description		
	Value(s)	1-999	

Appendix X An example XML file


```xml
<?xml version="1.0" encoding="ISO-8859-1"?>
<HERSURRecordUpDate xmlns="x-schema:Hersur_Schema.xml">
    <CruiseInfoRecord RecordType="CI">
        <Country>DEN</Country>
        <Ship>DAN2</Ship>
        <CruiseNo>8</CruiseNo>
        <Year>1998</Year>
        <DateStart>0626</DateStart>
        <DateEnd>0716</DateEnd>
        <UpperRightCornerLatitude>+5841200</UpperRightCornerLatitude>
        <UpperRightCornerLongitude>+1217500</UpperRightCornerLongitude>
        <LowerLeftCornerLatitude>+5619900</LowerLeftCornerLatitude>
        <LowerLeftCornerLongitude>+0357900</LowerLeftCornerLongitude>
        <AcousticContactFirstName>Jens</AcousticContactFirstName>
        <AcousticContactLastName>Pedersen</AcousticContactLastName>
        <AcousticContactEmail>jp@dfu.min.dk</AcousticContactEmail>
        <FisheriesContactFirstName>Person</FisheriesContactFirstName>
        <FisheriesContactLastName>ukendt</FisheriesContactLastName>
        <FisheriesContactEmail>N/A@dfu.min.dk</FisheriesContactEmail>
        <Sounder>2B</Sounder>
    </CruiseInfoRecord>
    <FisheriesRecords>
        <HHRecord RecordType="HH">
            <Quarter>2</Quarter>
            <Country>DEN</Country>
            <Ship>DAN2</Ship>
            <Gear>GOV</Gear>
            <StationNo>65</StationNo>
            <HaulNo>2</HaulNo>
            <Year>1998</Year>
            <Month>6</Month>
            <Day>28</Day>
            <TimeShot>2247</TimeShot>
            <HaulDuration>34</HaulDuration>
            <DayNight>N</DayNight>
            <LatDegrees>56</LatDegrees>
            <LatMinutes>38</LatMinutes>
            <LonDegrees>7</LonDegrees>
            <LonMinutes>33</LonMinutes>
            <EastWest>E</EastWest>
            <Depth>5</Depth>
            <HaulValidity>V</HaulValidity>
            <HydrographicStationNumber>unknown</HydrographicStationNumber>
            <SpeciesRecordingCode>11</SpeciesRecordingCode>
            <NetOpening>20</NetOpening>
            <Distance>4630</Distance>
        </HHRecord>
        <HERecord RecordType="HE">
            <Quarter>2</Quarter>
            <Country>DEN</Country>
            <Ship>DAN2</Ship>
            <Gear>GOV</Gear>
            <StationNo>65</StationNo>
            <HaulNo>2</HaulNo>
            <Year>1998</Year>
            <LatDegrees>56</LatDegrees>
            <LatMinutes>41</LatMinutes>
            <LonDegrees>7</LonDegrees>
            <LonMinutes>33</LonMinutes>
            <EastWest>E</EastWest>
            <TowingDirection>347</TowingDirection>
            <GroundSpeed>4</GroundSpeed>
```

```
            <WindDirection>22</WindDirection>
            <WindSpeed>55</WindSpeed>
            <LatDecimals>3</LatDecimals>
            <LonDecimals>8</LonDecimals>
            <HeadRopeDepth>77</HeadRopeDepth>
        </HERecord>
        <HLRecord RecordType="HL">
            <Quarter>2</Quarter>
            <Country>DEN</Country>
            <Ship>DAN2</Ship>
            <Gear>GOV</Gear>
            <StationNo>65</StationNo>
            <HaulNo>2</HaulNo>
            <Year>1998</Year>
            <SpeciesCode>8747010201</SpeciesCode>
            <ValidityCode>1</ValidityCode>
            <NoHour>105579</NoHour>
            <CatchWeightHour>32578</CatchWeightHour>
            <NoMeasured>292</NoMeasured>
            <LengthCode>0</LengthCode>
            <LengthClass>140</LengthClass>
            <NoAtLength>1085</NoAtLength>
            <No>0</No>
            <CatchWeight>0</CatchWeight>
        </HLRecord>
    </FisheriesRecords>
    <SMALKRecords>
        <CARecord RecordType="CA">
            <Quarter>2</Quarter>
            <Country>DEN</Country>
            <Ship>DAN2</Ship>
            <Gear>GOV</Gear>
            <HaulNo>1</HaulNo>
            <Year>1998</Year>
            <SpeciesCode>8747010201</SpeciesCode>
            <AreaSubareaType>2</AreaSubareaType>
            <AreaCode>40G0</AreaCode>
            <LengthCode>0</LengthCode>
            <LengthClass>170</LengthClass>
            <Sex>M</Sex>
            <Maturity>1</Maturity>
            <GrIdent>+</GrIdent>
            <AgeRings>1</AgeRings>
            <Number>10</Number>
        </CARecord>
    </SMALKRecords>
</HERSURRecordUpDate>
```

ANNEX 5

USERS MANUAL
INTERNATIONAL ACOUSTIC SURVEY DATABASE

MARCH 2000

VERSION I
REV. 1

TABLE OF CONTENTS

Section **Page**

INTRODUCTION

This document is a users guide to accessing and using the website containing the International Acoustic Survey Database, the database system described in **[Requirements Specification for the HERSUR Project, Rev. 1]** which is based on **[Working Paper 1998]**.

.

The purpose of this manual is to guide the user through the process of accessing the Hersur database, uploading data to the database and downloading data from the database.

Once logged on to the website, the user will be able to read all data from the countries participating in this project, and to download the data from the respective countries, but unable to upload Your own data.

For the data exchange format, see **[HERSUR Database Exchangeformat Specification]** (latest issue).
If there's anything in this document or You are experiencing problems with the database Website, You are welcome to contact the administrators of the website. At the moment You can reach them by sending an email to the Scientific project leader, Karl-Johan Staehr (kjs@dfu.min.dk), and he will direct Your questions on to the right recipient.

1 FINDING YOUR WAY TO THE DATABASE

The database resides on the internet. At the moment it's place on a server in DIFRES (DFU), sited in Lyngby, Denmark. The URL, Uniform Resource Locator (Internet address) is:

Hersur: http://www.dfu.min.dk/hersur

Baltdat: http://www.dfu.min.dk/baltdat

When you type this address into your Internet Browser (which at he moment MUST be a Microsoft Internet Explorer version 5.0, or later (because it is the only browser that supports XML, E**x**tensible **M**arkup **L**anguage, in full), you will come to Website Logon Screen.

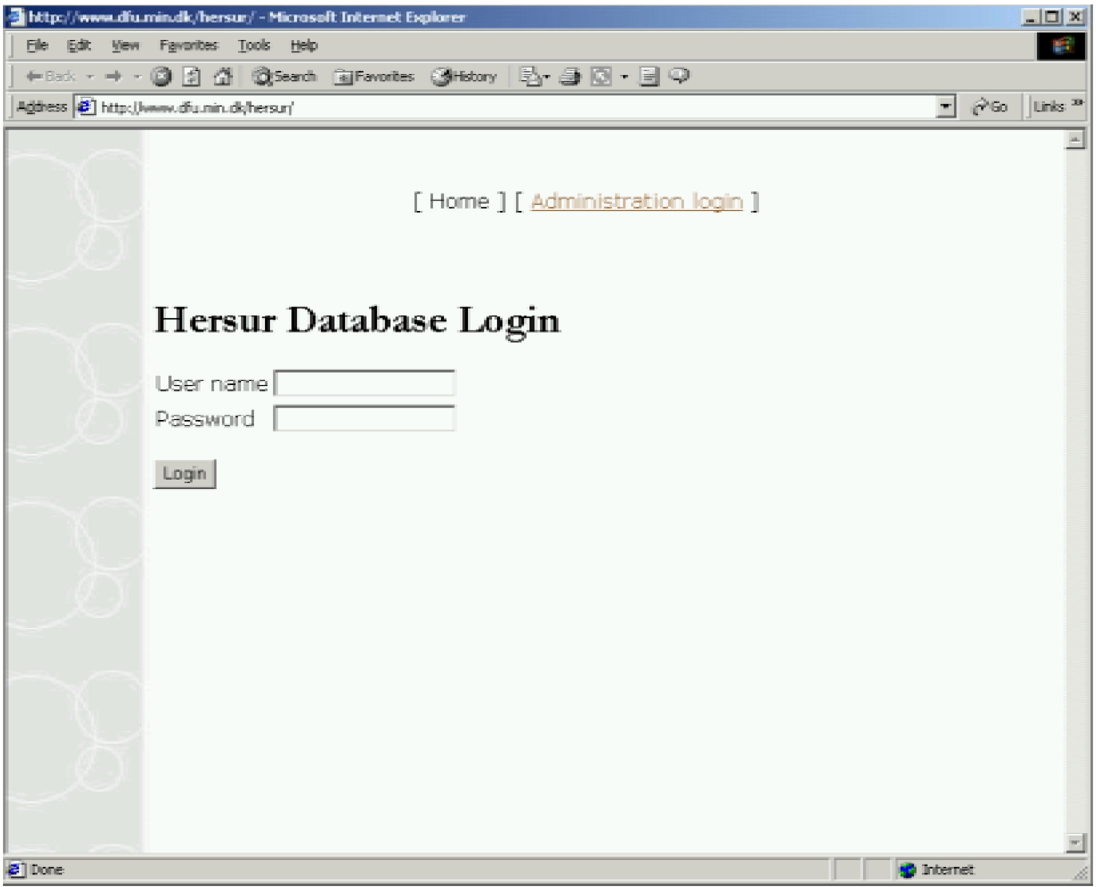


Figure The Website logon screen (here: Hersur)

At this point you most certainly want to login to the database system, but you have to get the username/password from DIFRES, so send an email (mailto://kjs@dfu.min.dk) stating the following information:

Firstname
Middlename
Last Name
Country

Email address (very important for receiving latest info and username/password)
As soon as you have been added to the user database the administrator of the database will send you a username and password by email, and you will then be able to enter the database area. Type Your username and password into the correct fields, press the Enter key on your keyboard or place the computer cursor on top of the LOGIN key on the login screen and press the mouse button.

2 VIEWING DATA IN THE DATABASE

You are now ready for using the database (viewing, converting data between formats, uploading data, and downloading data).

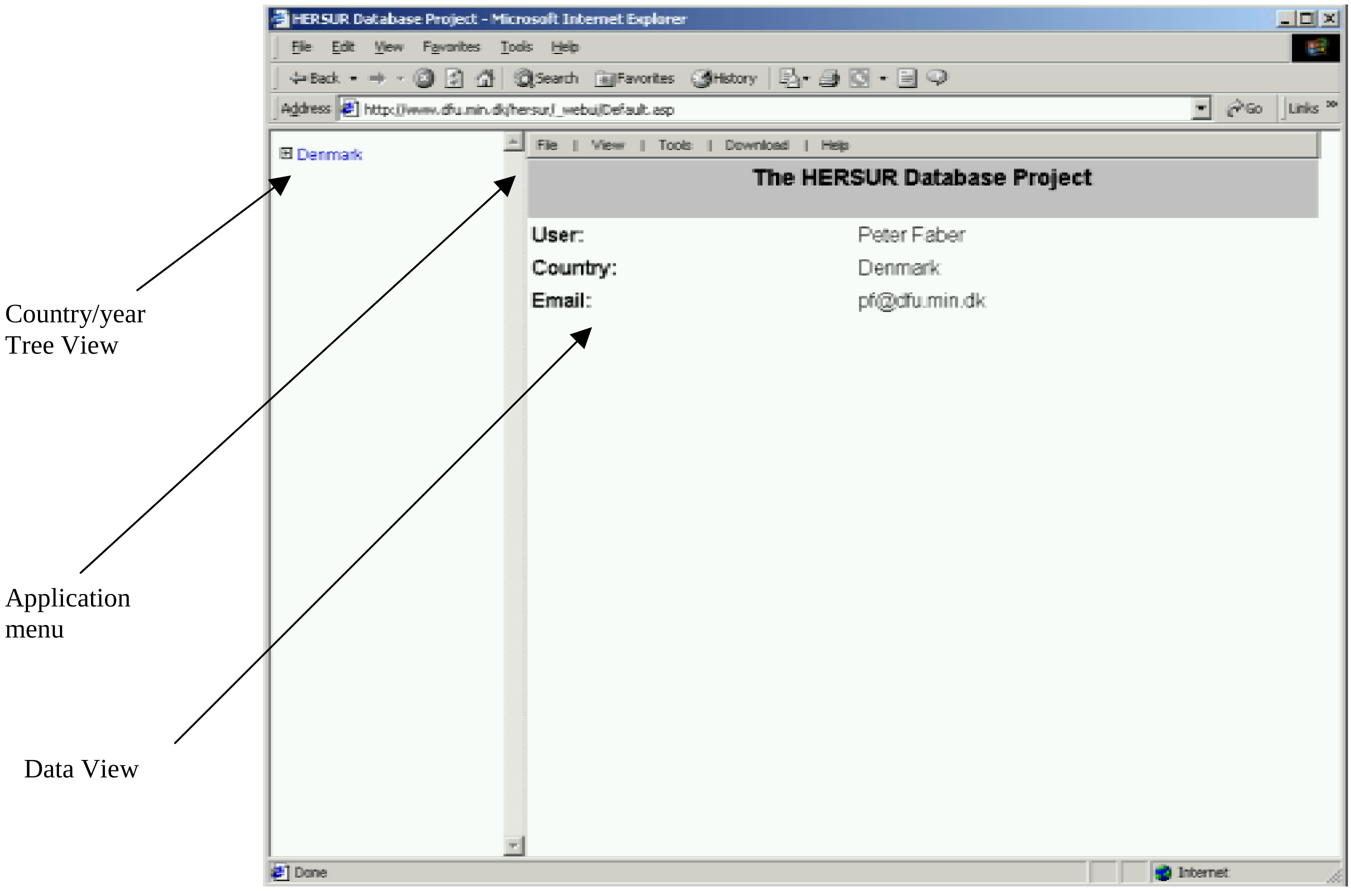


Figure The first view You will see when entering the website

As You can see, has the browser window been divided into three parts:

1. The country Year/view
2. The 'application' menu
3. The dataview

2.1 Navigating the country/year TreeView

In this part of the screen You will bee able to see a short view (overview) of the data present on the system. At first when You enter, the selected view will be by country (list sorted by country name. There is an alternative view (Year View), which You can select from the menu item 'View'.

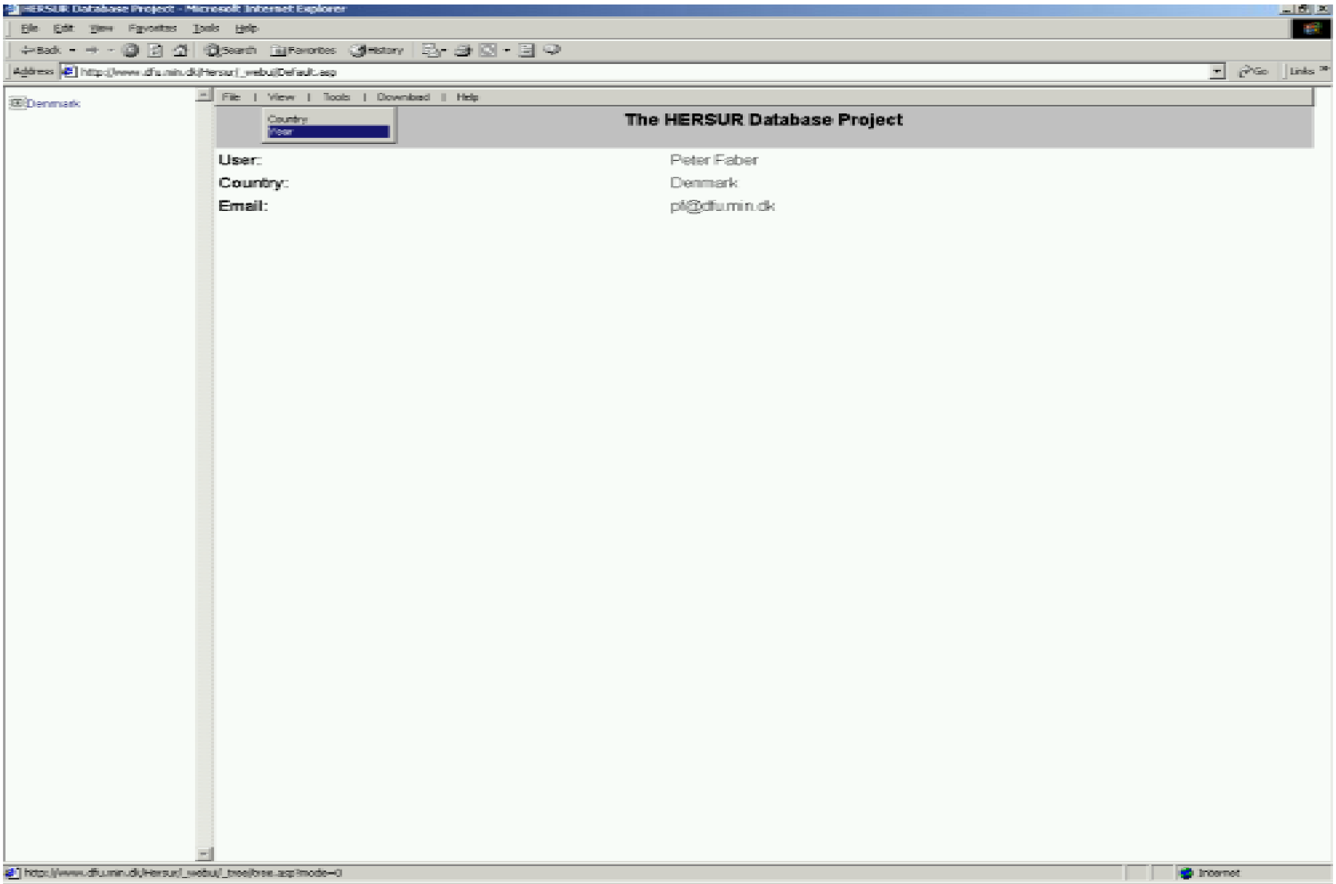


Figure Selecting either year or country view in tree view

If there's a + sign next to the line, then by clicking the + sign, the tree will expand and show a – sign (collapse again by clicking the – sign). Figure 4 shows the tree view at its maximum expansion:

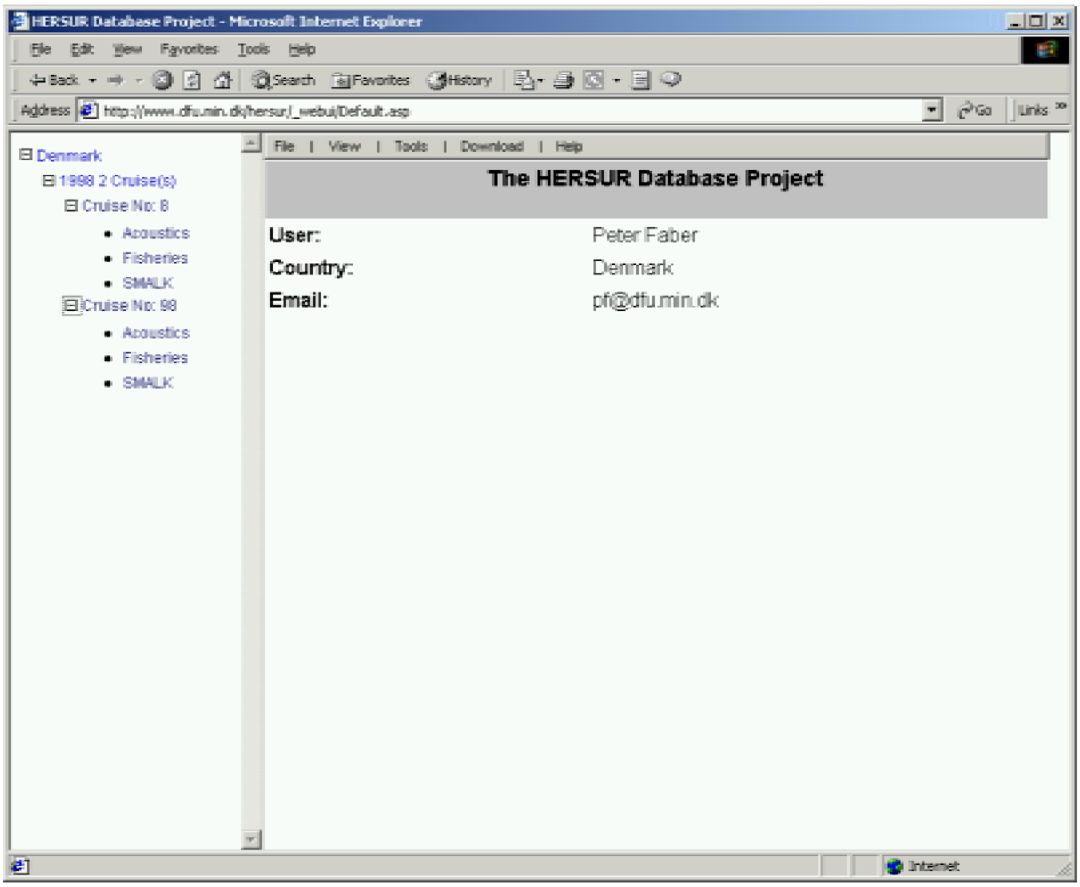
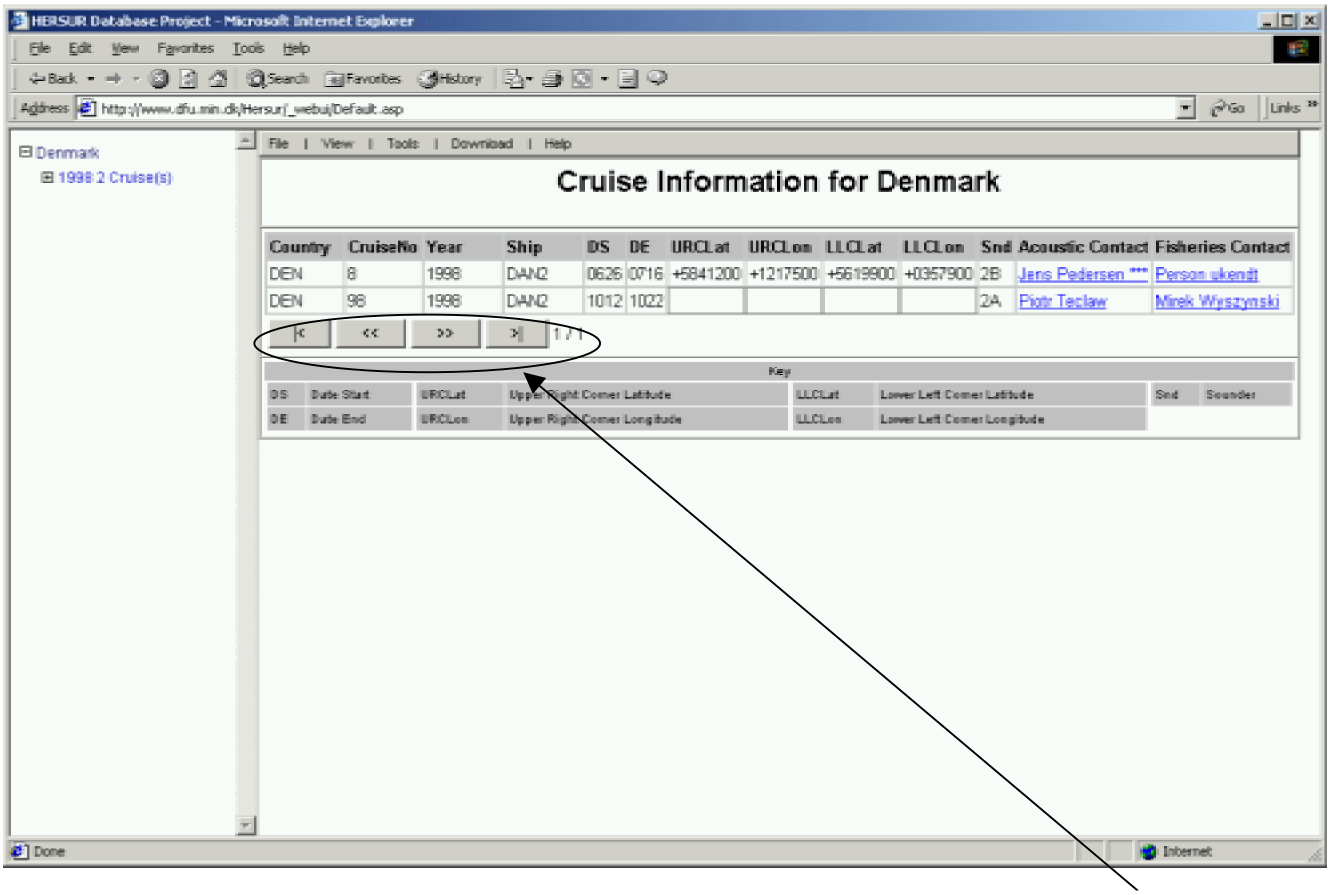


Figure Tree view maximum expanded

As the tree expands the information becomes more and more specific on the data. By selecting branches on the tree you can change from viewing your personal data, to viewing cruise specific data:



VCR Buttons

Figure Denmark 'country branch' selected on tree view

If the data shown in the view exceeds the predefined size a number of pages will be selectable with the VCR buttons (You can scroll through the data pages).

The last view that shall be mentioned here, is the data record view. Selecting the fishing records branch of a cruise, will give us data similar to the view in Figure 5. To room the entire record within the browser width, the fieldnames of the records has been abbreviated in the records field headers, but the translation tables are given in the bottom of the browser page.

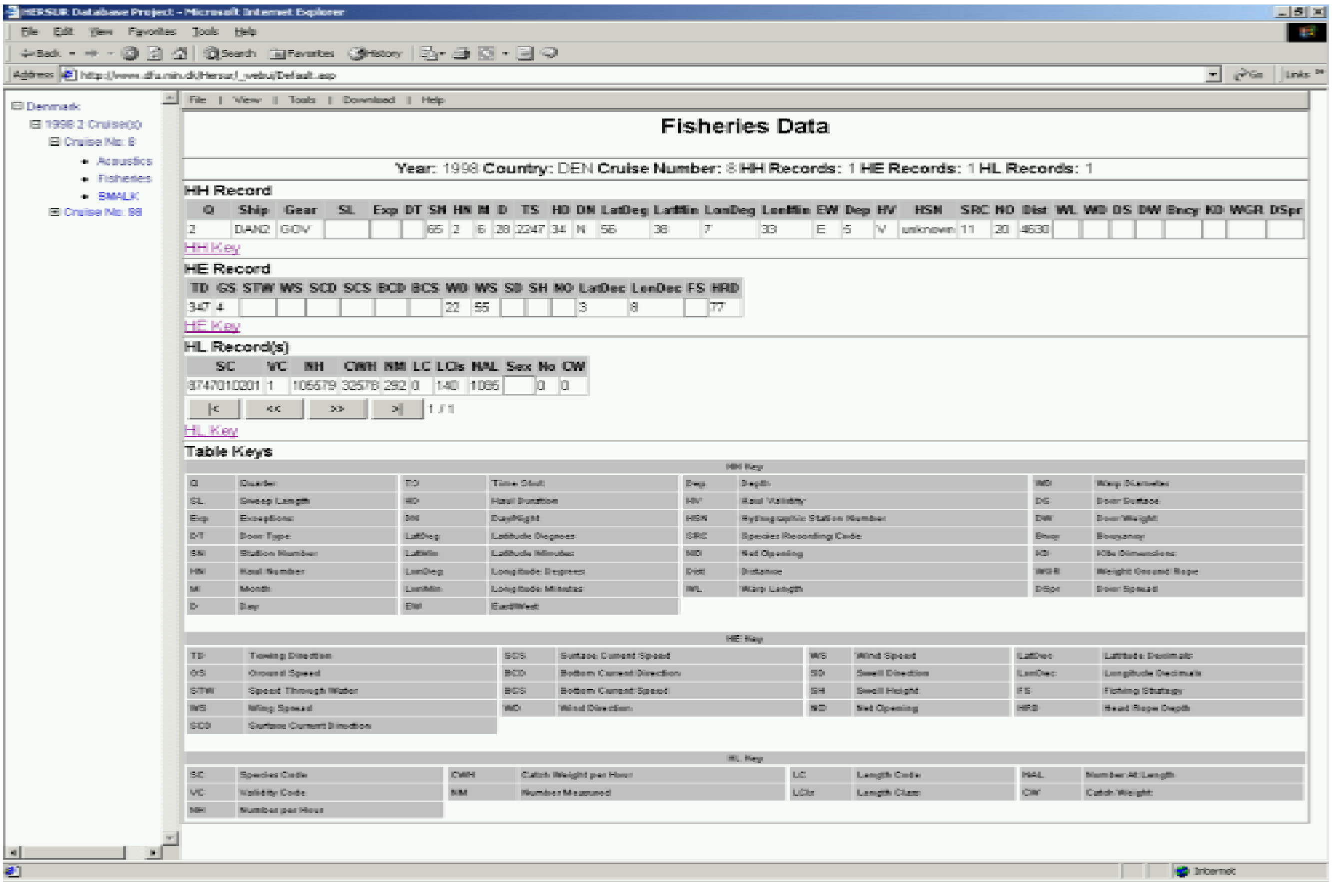


Figure Viewing a data record set, here the fisheries records of a test cruise (data are partially fictitious).

3 DOWNLOADING DATA FROM THE DATABASE

To download data from the database is very simple. you download data as an XML file, but if you want it in the IBTS fixed record length file type format, there are tools at the website to make the conversions between XML and FLR (**f**ixed **l**ength **r**ecord). In the application menu there is a download menu item, which can be selected as soon as you have chosen at minimum a Cruise branch on the country/year tree view.

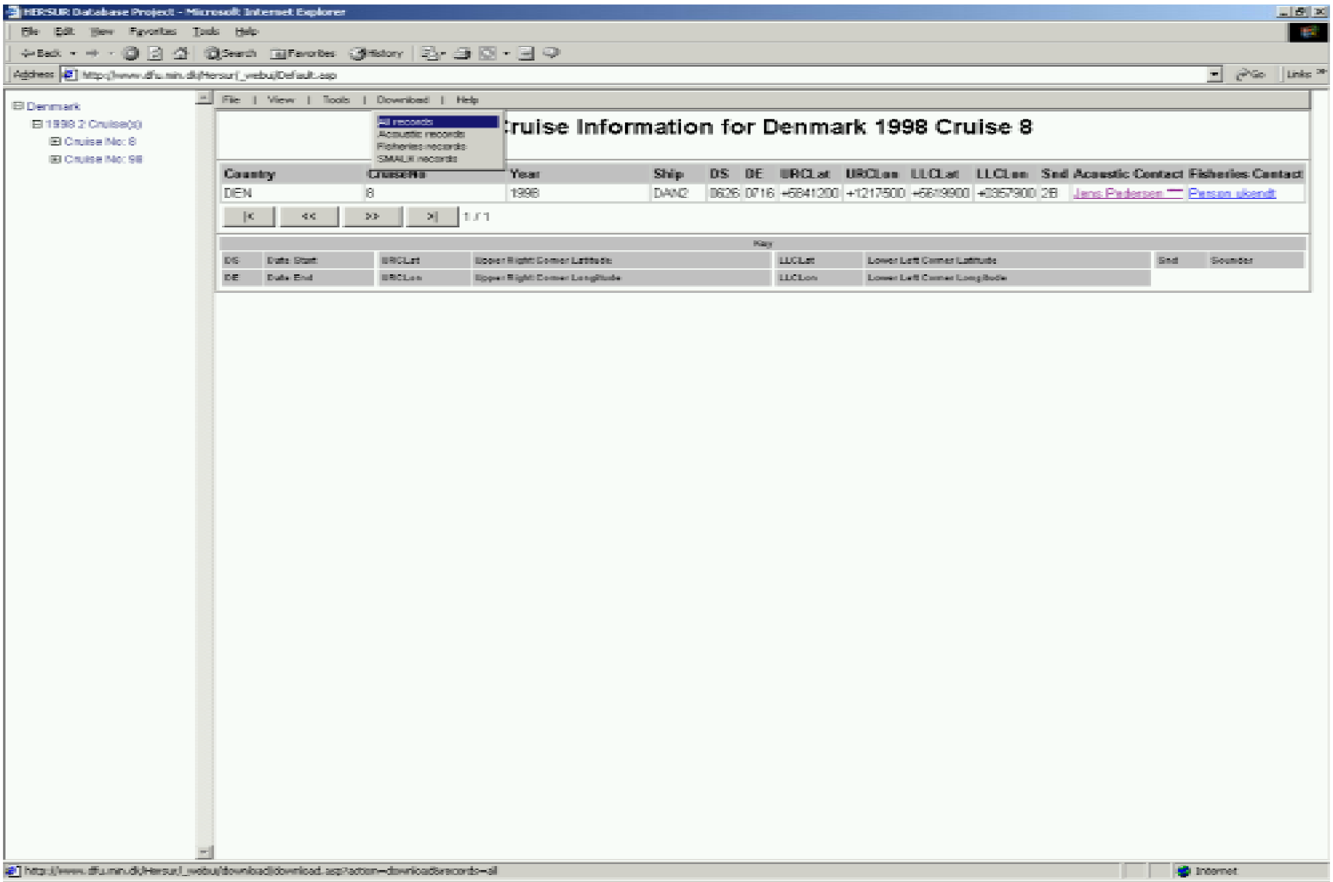


Figure Selecting to download all record types from the cruise selected in the tree view.

When you have selected the download type, the system immediately starts selecting records from the right cruise in the database. This process can take from few seconds to a few minutes, all depending on how many records of the specified type there's on the database server.

When the server has finished retrieving records it presents the files on the screen ready for download as whenever you are downloading files. Here you right-click your computermouse having placed the cursor on top of the file to download.

Notice, that there will always be a schema file present along with the data file (The purpose of this file, is that it has to be used whenever you are viewing the data file with the Internet browser to structure the data). The browser brings up a pop-up menu in which you select the "Save target as…" menu item (language dependable), and chooses where on your local computer to put the file.

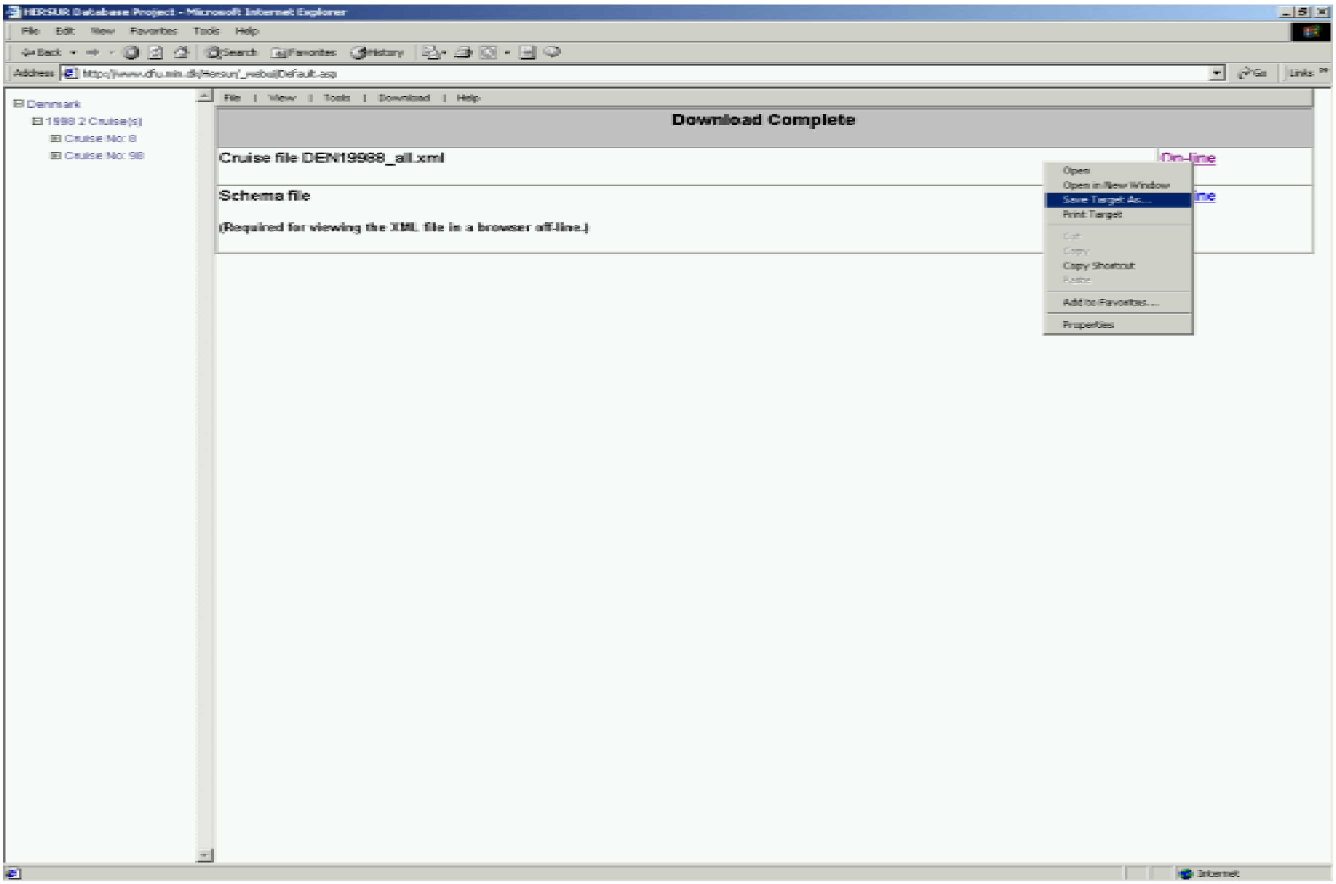


Figure Choose "Save target as...." and select download path.

Should you now be interested in converting the data file to FLR file format, then use the tools menu item on the application menu, and in the submenu choose the “Convert to ascii” (actually XML->FLR)

In the input field specify the XML file that you want to convert (the one you have just downloaded or any exchange format valid XML data file containing valid Hersur data).

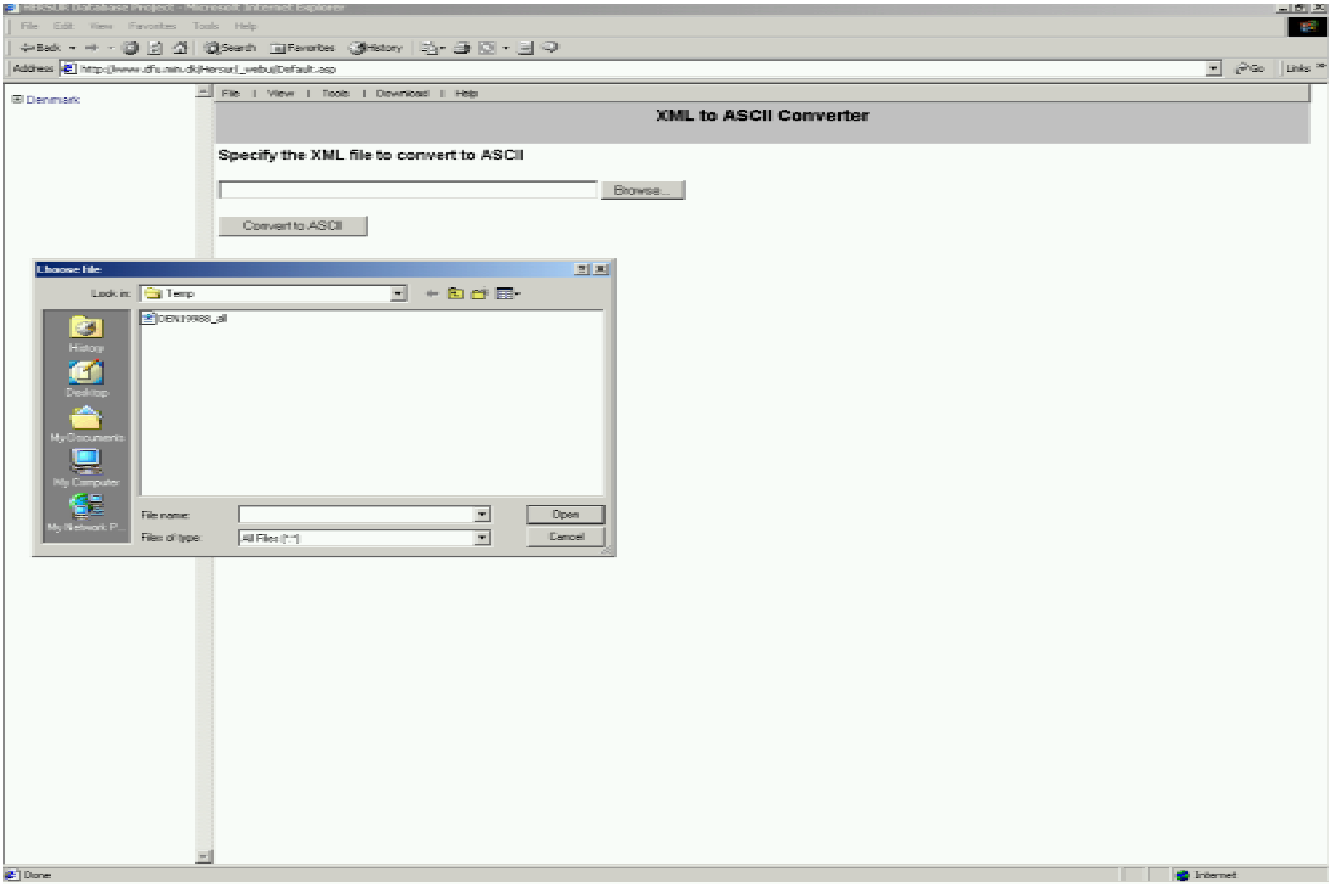


Figure Selecting XML file to convert to FLR (locally placed file)

When you select the “Convert to ASCII” button the browser uploads the file to the server, which converts the file, and prepares the file so you can download it again as you did in the previous step with the XML file.

Download this file, and you have a data file in the IBTS FLR type file format.

4 UPLOADING DATA TO THE DATABASE

Uploading data to the website is done using the application menu. Choose the ‘Tools” menu item in the menu. If your datafile is an XML file then choose to “Upload cruise” (it will be validated on upload), unless You just want to check your data. On the other hand if the data is in the FLR file format, then you have to convert it to an XML file before you can upload it.

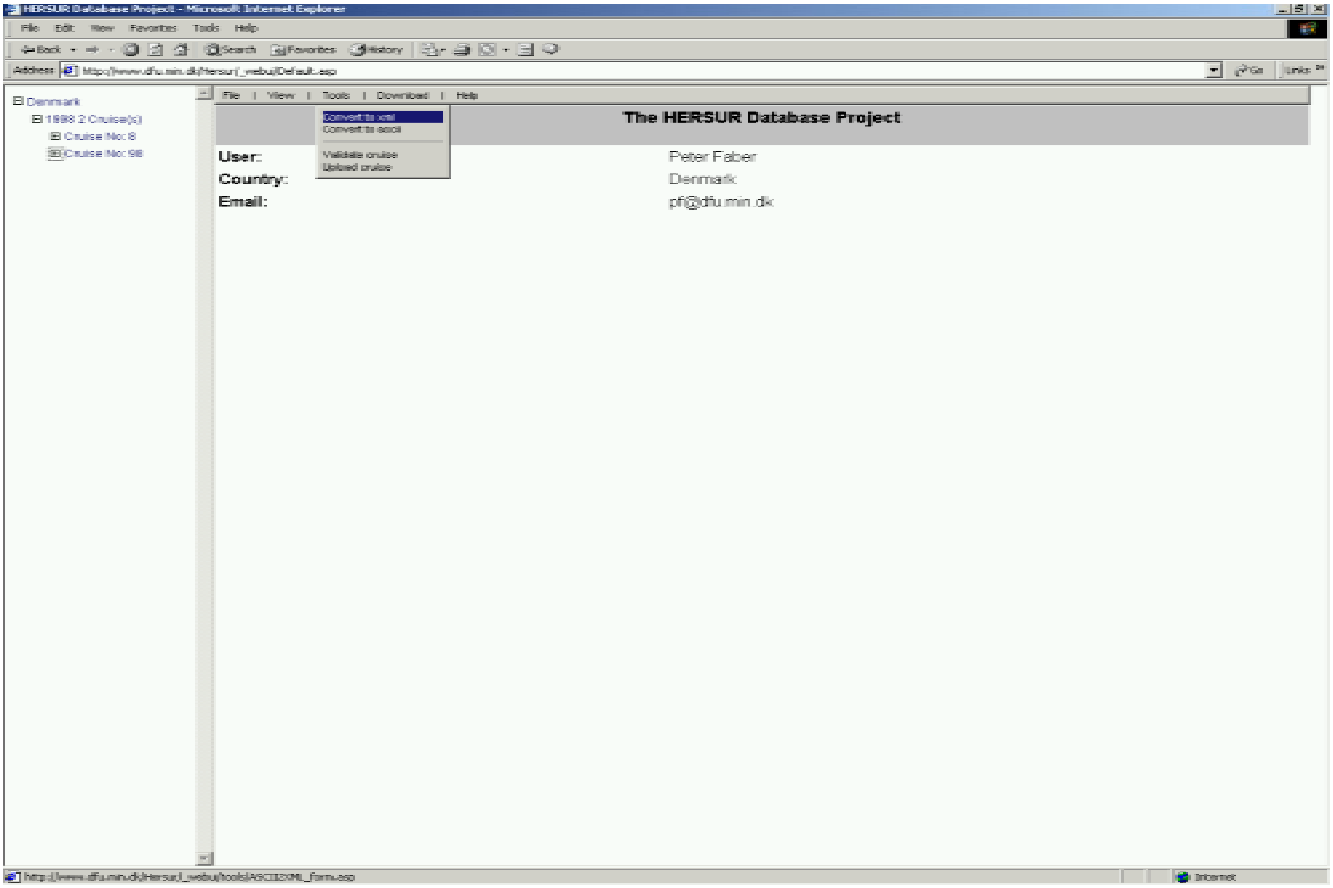


Figure Selecting to convert data before uploading

As soon as you have selected to convert your data file to an xml type file, a new screen appears, in which you can type the local path to your data file, or choose to browse for it by ‘clicking’ the Browse button.

When You’ve entered the filename in the edit field, you ‘click’ the Convert button to start converting your data file. This again may take some time depending on the amount of data in your file.

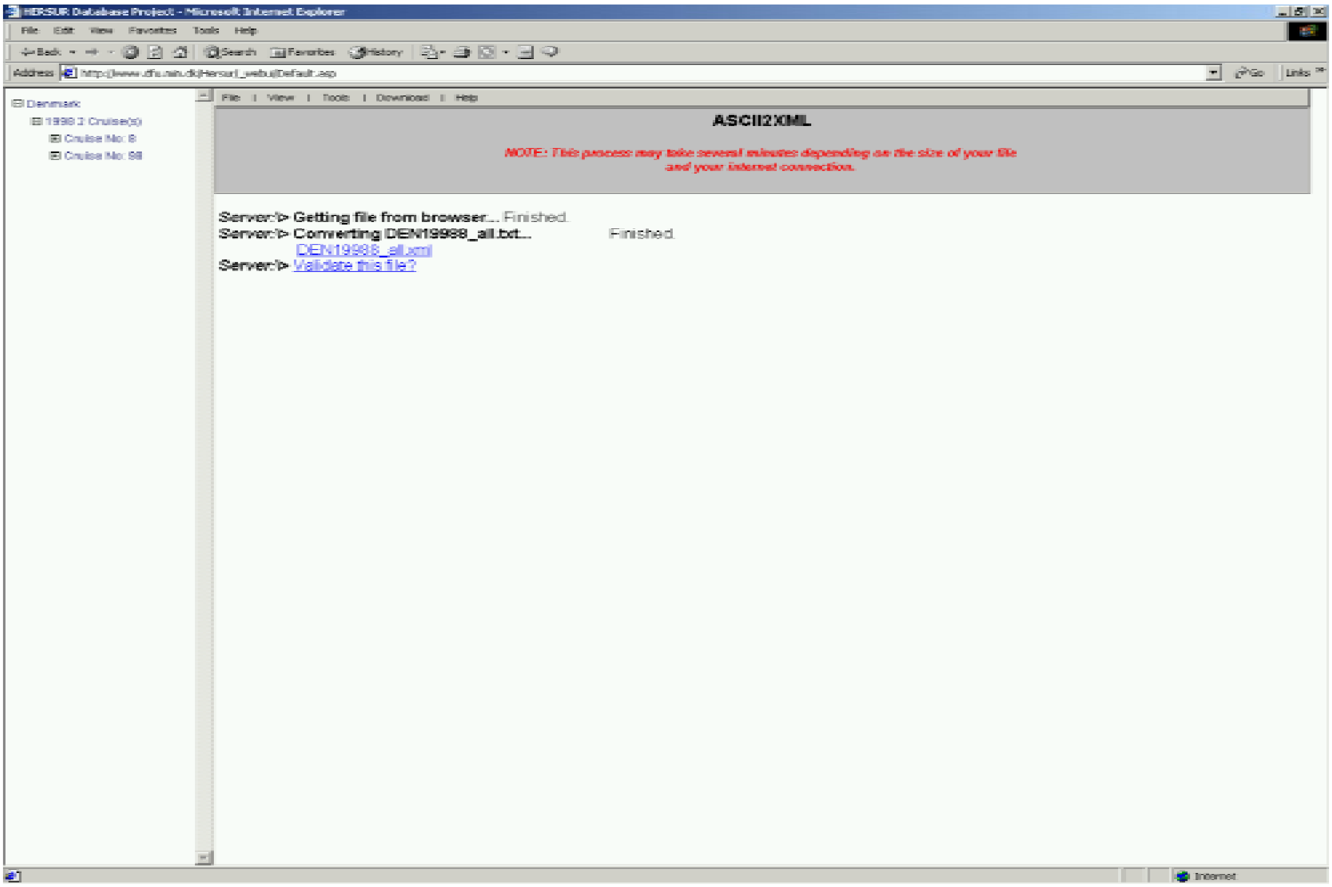


Figure The server has finished converting the data file, and you can now choose to download or continue to validate the file.

If you now select the hyperlink “Validate this file?” the system automatically proceeds with the validation of the file. In fact you save time in downloading and uploading again!

In the next process the you will receive information onscreen for every step in the validation.

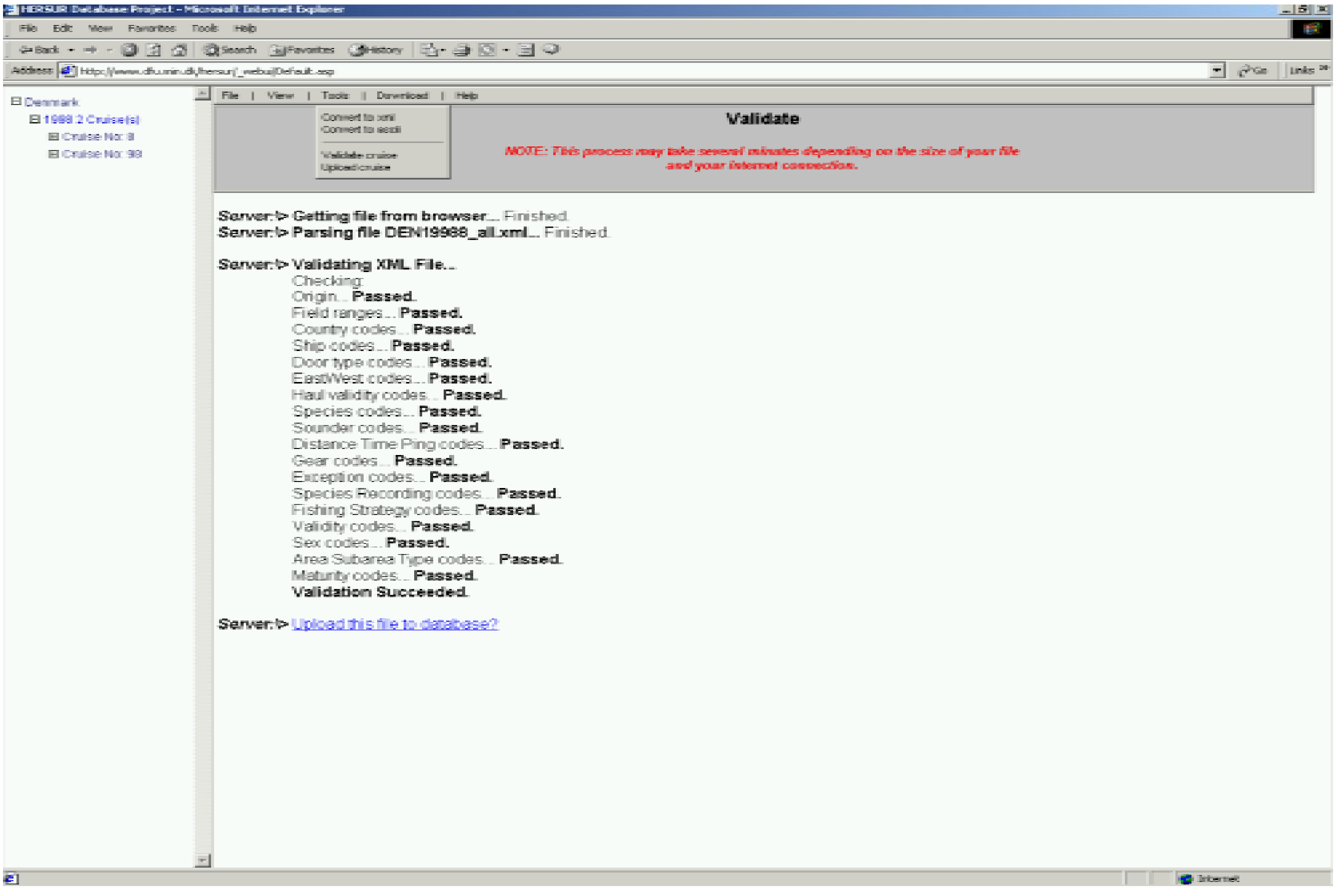


Figure The server has successfully validated the file. You can stop now or continue to update the database with the data in the file.

Should your data by accident NOT be valid you will be given the possibility to view (or download) an error file containing information on which records have errors.

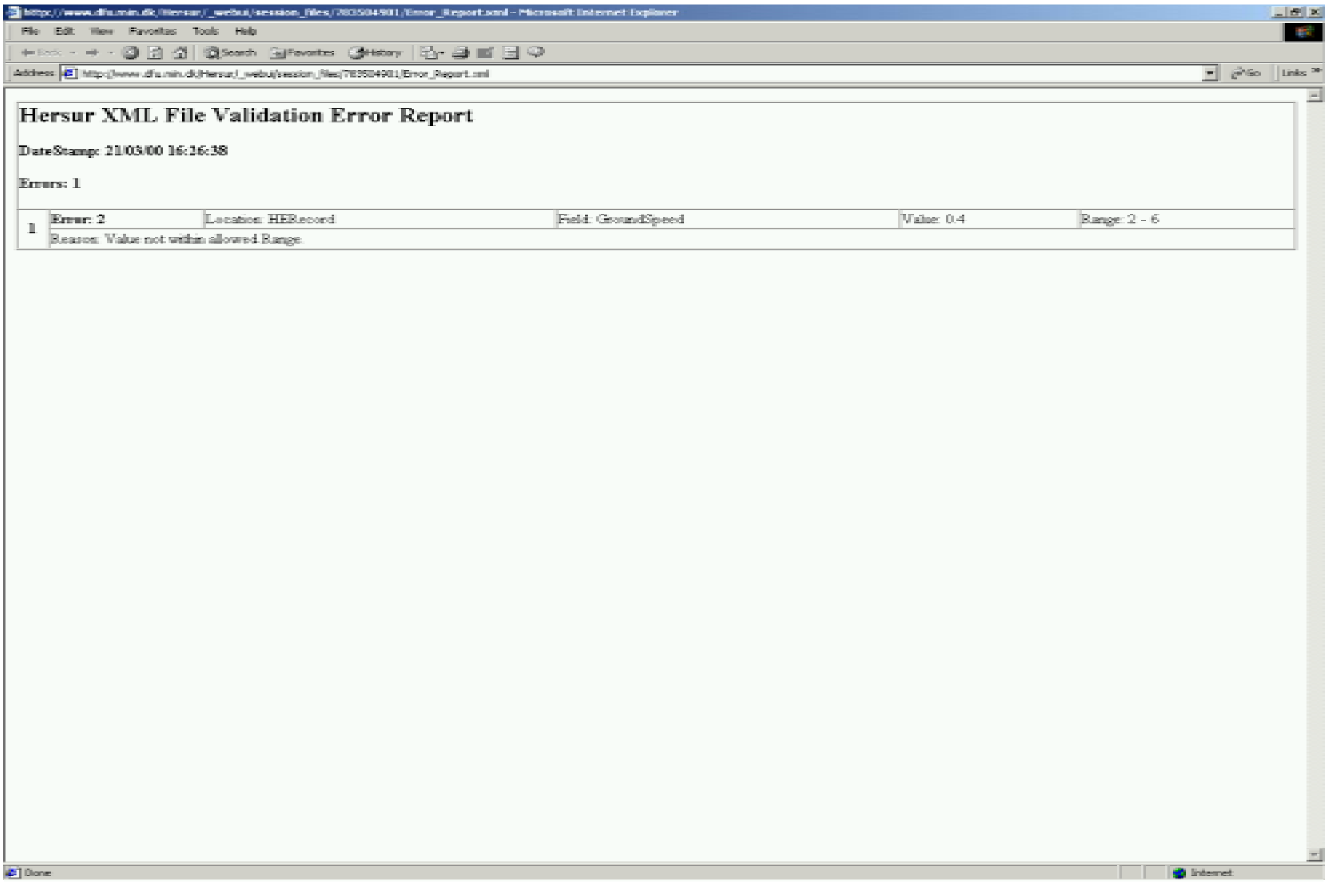


Figure Range error in data file, GroundSpeed should be between 2 and 6 knot, but is 0.4 knot!

If this happens you have to correct the data and start over again.

If successful and you proceed with the update and the data already exists in the database IT WILL BE OVERWRITTEN!

If the cruise exists and you are updating (you have put you sa records in here before, but now have prepared fisheries data and/or the SMALK records, IT WILL BE ADDED TO EXISTING DATA.

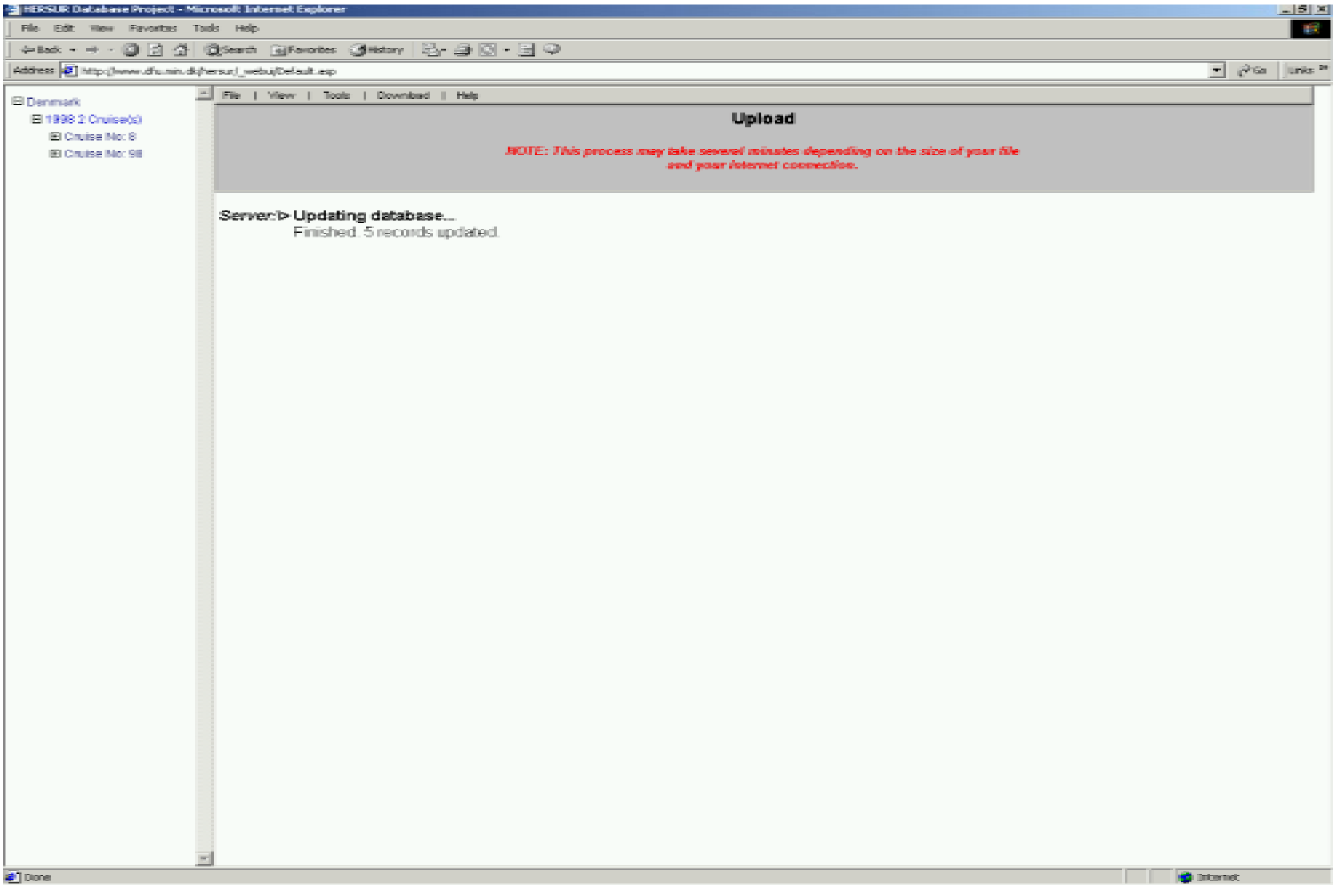


Figure The database has been successfully updated, and if you refresh your browser (F5 on I.E.), you will now be able to see your cruise on the tree view (if it wasn't already there).

5 REFERENCES

[Working Paper 1998]

International database for acoustic data and biological sampling for surveys in the North Sea and West Of Scotland, Proposal for a database structure and database exchange format, Working Paper, study Group on Baltic Acoustic Data 1998, Hersur project, Ver. 3.0 .

[Requirements Specification for the HERSUR Project, Rev. 1]

'Requirements specification for the HERSUR project, Revision I', DIFRES, Fall 1998

[HERSUR Database Exchangeformat Specification]

'HERSUR/BALTDAT Exchange Format Specification, Version 1, Rev. V, March 2000', Peter Faber, DIFRES

ANNEX 6

Original: 7 January 2000
Last revision: 7 January 2000

Manual for the construction and use of the International Standard Trawls for Baltic Demersal Surveys

---

TV3 930 meshes

DRAFT

NOTE: The manual is still under construction and has not yet been approved by ICES

References

<To be specified>

Content

Two trawls are specified as International Standard Trawls for Baltic Demersal Surveys:

- TV3 520 meshes in the circumference for vessels less than 600 KW (Separate manual)
- TV3 920 meshes in the circumference for vessels of more than 600 KW (This manual)

The manual consists for each trawl of 8 pages:

Notes to the construction

The nets should be made from good quality Polyethylene. It will however not be possible for the net manufacturer always to obtain sheet netting of exactly the same length as specified in this manual. Thorough care must be taken to obtain materials with properties as close as possible to the ones specified here.

IMPORTANT: It is very important to maintain the original relationship (hanging ratio, difference) between the netting lengths and the framing ropes along the headline and footrope. So if the headline in a section shall be 10% longer than the net according to this manual, it must be so, also if the dimensions of the net differ from the present specification.

Operation of the standard trawls

Towing speed

The towing speed should be 3.0 knots

Warp length

<A table indicating the correct warp length to be used at different fishing depths will be included in a later version of the manual>

Maintenance

The net should be regularly checked for wear and tear and every damage shall be repaired upon discovery.

The net will eventually stretch under normal fishing conditions. It is important for its fishing performance and for maintaining a constant fishing efficiency at regularly intervals to check the length of the bridles, sweeps, extensions, netting sections etc.

The net and rope dimensions should be checked at least at the beginning of every cruise. Special check lists can be used. <These checklists will be elaborated and attached to the manual at a later stage during 2000)>

IMPORTANT: It is especially important to take thorough care that the relationship (difference) between the length of the netting sections in the top and bottom panels are maintained. Most lower sections are a half mesh or a full mesh longer than the corresponding top section. This difference have to be maintained by monitoring the net at regular intervals.

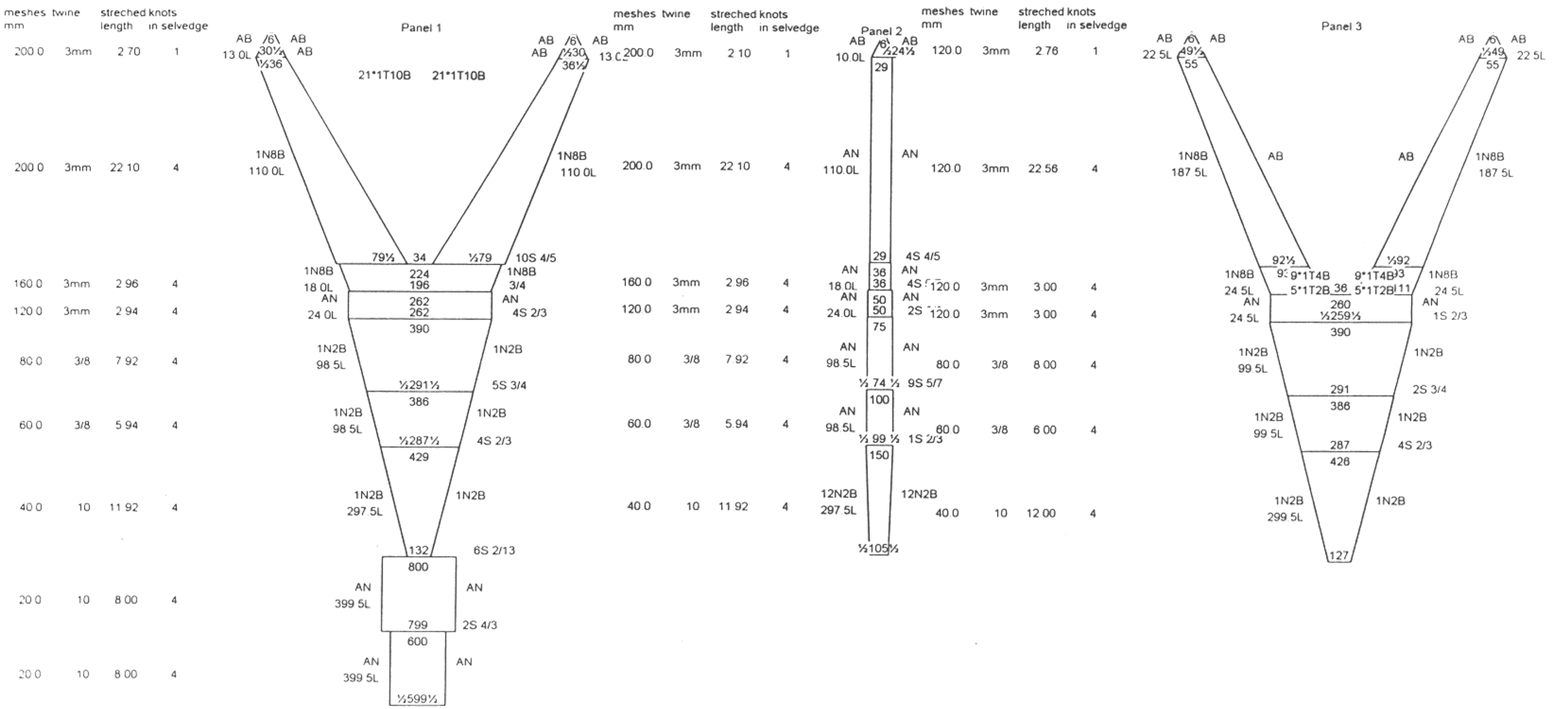
This care must also be taken to ensure that the top, side and bottom wings and wing extensions have correct proportional length. This is measured by taking the total length from the joining round of the wing to the eye of the wing extension.

Parts List

International Standard Trawl for Baltic Demersal Surveys

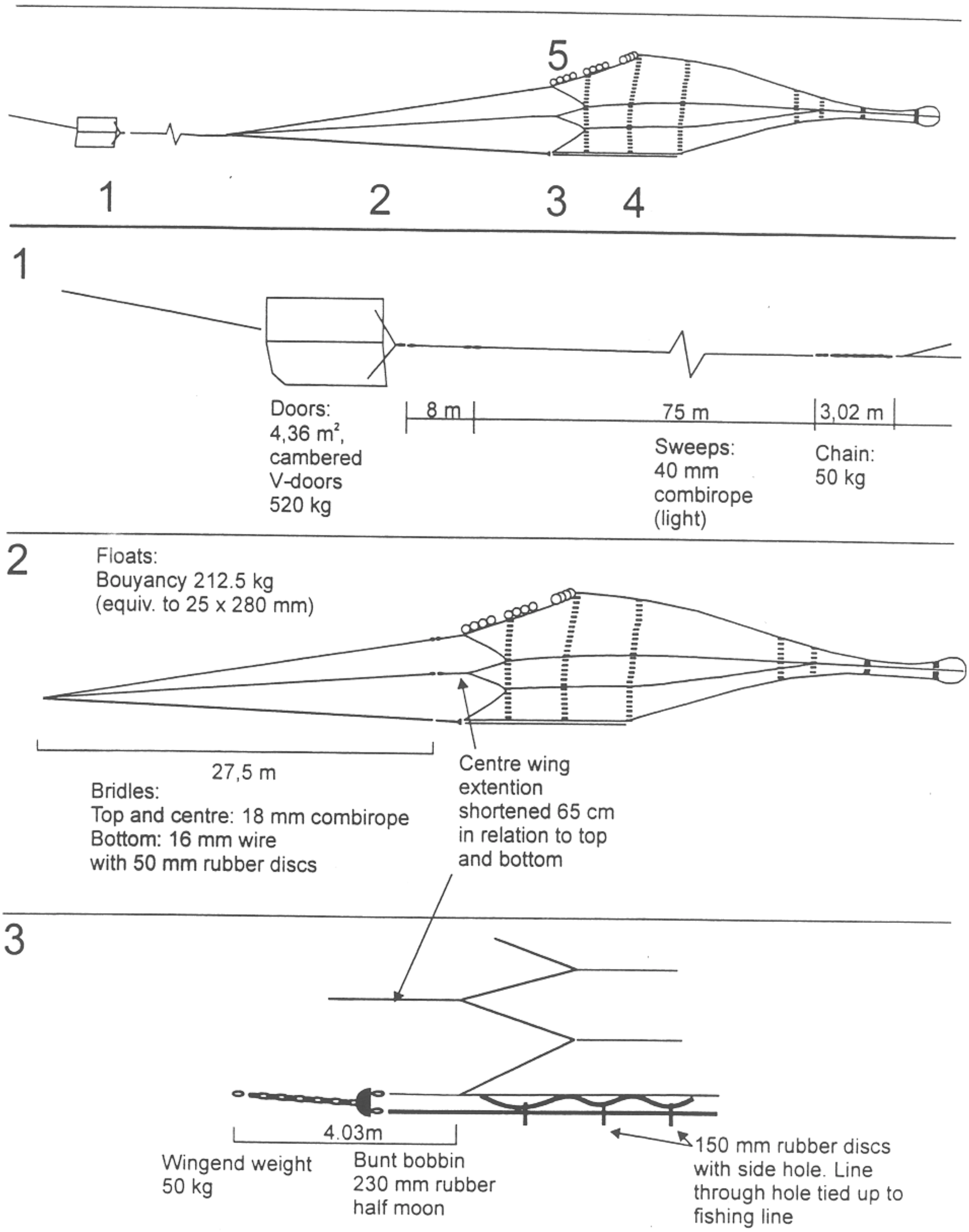
	No	Item	Description	Size
Trawl doors				
	2	Doors	Cambered V-doors, Type: Thyborøn Trawl Doors Type 2	4.35 m^2 Weight 520 kg
		Front Chain	Recommended setting: 23 links using link 6 for warp attachment	Inside length of link 100 mm
		Back Chain	Top chain: 10 links Horizontal chain: 24 links Bottom chain: 9 links	Inside length of link: 80 mm
	2	Back strop	Wire or combination rope	Ø = no standard Length 8 m
Sweeps				
	2	Sweep	Combination rope (light)	Ø = 40 mm Length 75 metre Weight per metre 1.60 kg
Chain between sweeps and bridles				
	2	Chain	Iron	Length 3.02 m Weight in air: 50 kg
Bridles				
	4	Upper and centre bridles	Combination rope	Ø 18 mm Length: 27.5 m Weight per metre 0.46 kg
	2	Lower bridle	Wire Rubber discs	Ø 16 mm Length 27,5 m Weight per metre 0.95 kg Ø 50 mm
Floats				
	(25)	Floats	(11 litre (same as 11") plastic floats)	Total buoyancy: 212.5 kg (equivalent to 25 pcs. of 280 mm plastic floats)

Headline and Fishing line				
	1	Headline	Combination rope, stainless	Ø = 16 mm Length 67.60 m incl. extension Weight per metre 0.39 kg
	1 2 2	Fishing line	Combination rope, stainless Chain weight Semi-spherical rubber bunt bobbins	Ø = 16 mm Length 69.64 m incl extension and weight Weight per metre 0.39 kg Length 3.02 m Weight in air: 50 kg Ø = 230 mm
Footrope				
		Centre Wire	Wire, stainless steel	Ø = 13 mm Weight per metre 0.66 kg
		Large rubber discs		200 mm
		Small rubber discs		150 mm
		Filling	rubber discs	45 mm
		Rope to mount the gear	Combination rope mounted in bights on the fishing line and through the rubber discs	Ø = 12 mm Weight per metre 0.20 kg The length of the bights shall make the disc periphery hang 4 cm from the fishing line
		Wire lockers	To mount the wire to the fishing line	
Attachments				
		Lazy deckie	No standard	
		Tackle strop	No standard	

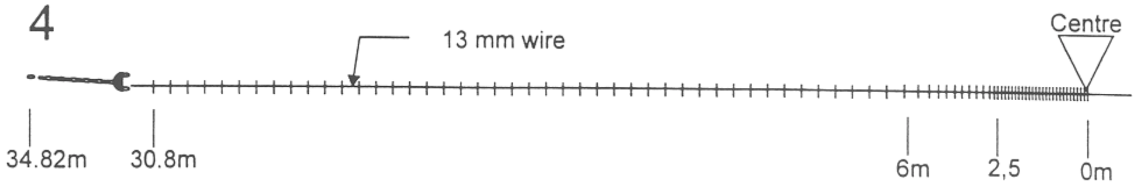


Trawl : TV3 930 # 80 mm full mesh
Type : ICES International Baltic Fish survey trawl
Company :
Ship : Large vessels
File : F530 930_80 ICES TV3.ctf
Date : 15-12-1999 Design :

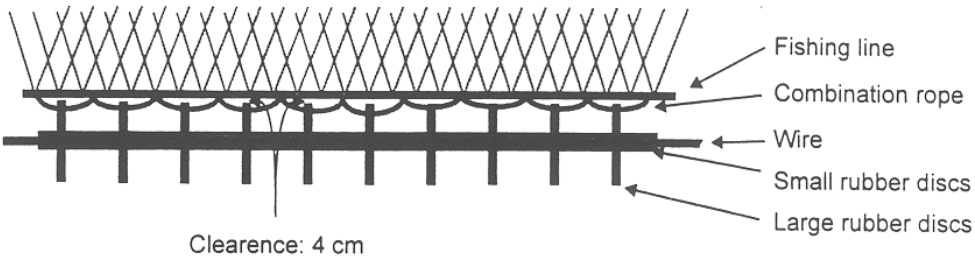
TV3, 930#
Construction details
Not to scale



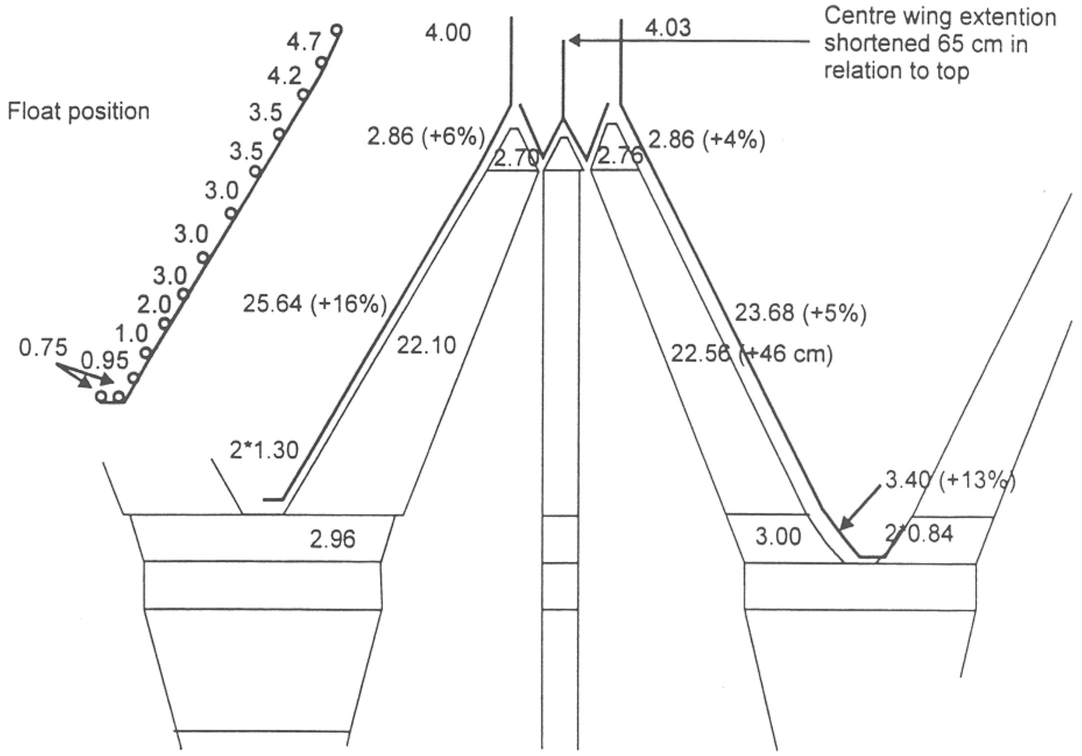
4



0 - 2.5 m: 200 mm rubber disks with side hole, 100 mm distance
2.5 - 6 m: 200 mm rubber discs with side hole, distance gradually increasing from 100 mm to 500 mm
6 - 30.8 m: 150 mm rubber discs with side hole, 500 mm distance
0 - 30.8 m: 45 mm rubber discs filling all the space between the large discs



5 **Framing rope and netting lengths, float position**



Original: 7 January 2000
Last revision: 7 January 2000

Manual for the construction and use of the International Standard Trawls for Baltic Demersal Surveys

TV3 520 meshes

DRAFT

NOTE: The manual is still under construction and has not yet been approved by ICES

References

<To be specified>

Contents

Two trawls are specified as International Standard Trawls for Baltic Demersal Surveys:

- TV3 520 meshes in the circumference for vessels less than 600 KW (This manual)
- TV3 920 meshes in the circumference for vessels of more than 600 KW (Separate manual)

This manual consists of 9 pages:

Notes to the construction

The nets should be made from good quality Polyethylene. It will however not be possible for the net manufacturer always to obtain sheet netting of exactly the same length as specified in this manual. Thorough care must be taken to obtain materials with properties as close as possible to the ones specified here.

IMPORTANT: It is very important to maintain the original relationship (hanging ratio, difference) between the netting lengths and the framing ropes along the headline and footrope. So if the headline in a section shall be 10% longer than the net according to this manual, it must be so, also if the dimensions of the net differ from the present specification.

Operation of the standard trawls

Towing speed

The towing speed should be 3.0 knots

Warp length

<A table indicating the correct warp length to be used at different fishing depths will be included in a later version of the manual>

Maintenance

The net should be regularly checked for wear and tear and every damage shall be repaired upon discovery.

The net dimensions should be checked at least at the beginning of every cruise. Special check lists can be used. <These checklists will be elaborated and attached to the manual at a later stage during 2000)

The net will eventually stretch under normal fishing conditions. It is important for its fishing performance and for maintaining a constant fishing efficiency at regularly intervals to check the length of the bridles, sweeps, extensions, netting sections etc.

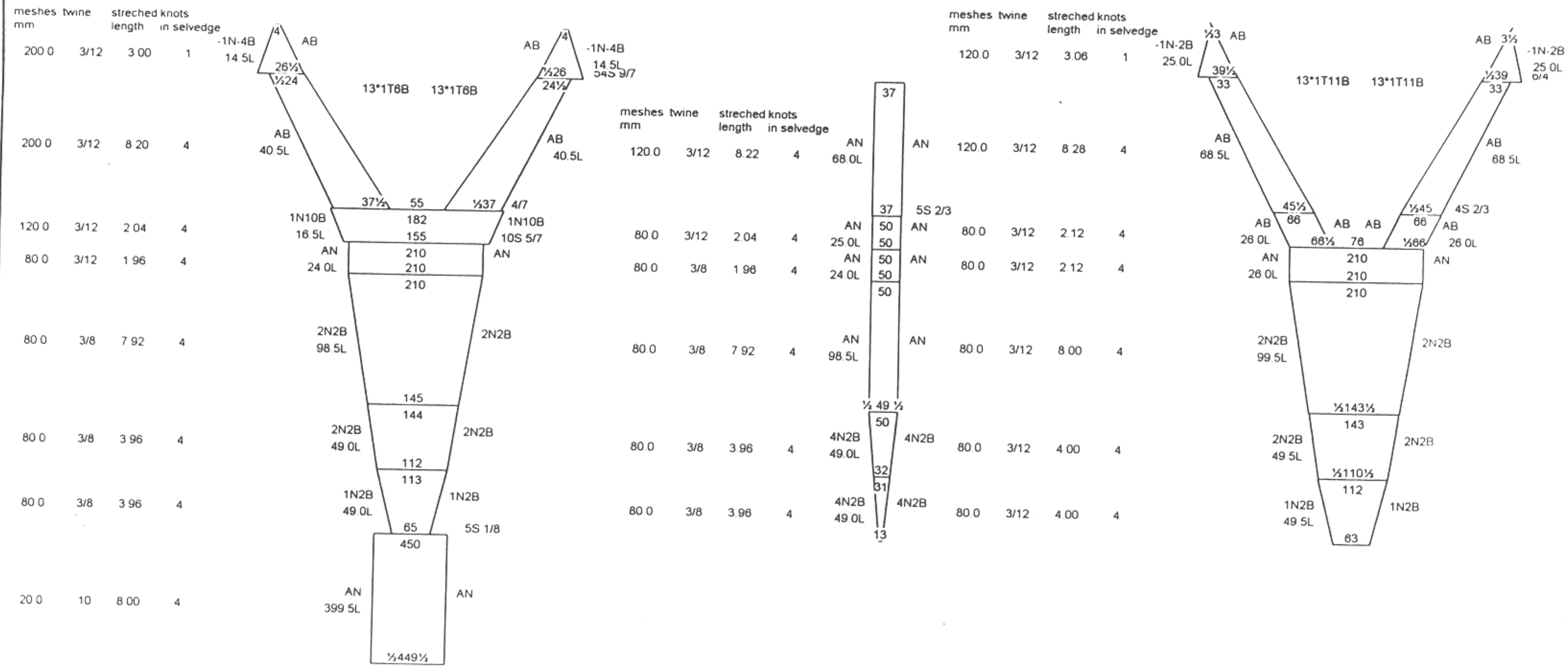
IMPORTANT: Special attention should be given to ensure that the relationship (diffe-rence) between the length of the netting sections in the top and bottom panels are maintained. Most lower sections are a half mesh or a full mesh longer than the corresponding top section. This difference have to be maintained by monitoring the net at regular intervals.

Parts List

International Standard Trawl for Baltic Demersal Surveys

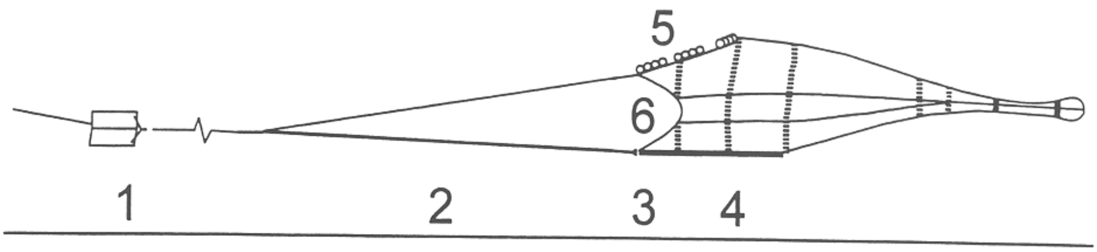
	No	Item	Description	Size
Trawl doors				
	2	Doors	Cambered V-doors, Type: Thyborøn Trawl Doors Type 2	1.94 m² (63 inch) Weight 235 kg
		Front Chain	Recommended setting: 18 links using link 5 for warp attachment	Inside length of link 80 mm
		Back Chain	Recommended setting Top chain: 7 links Horizontal chain: 18 links Bottom chain: 6 links	Inside length of link: 63 mm
	2	Back strop	Combination rope	Ø = no standard Length 8 m
Sweeps				
	2	Sweep	Wire Rubber disks	Ø = 10 mm Length 75 metre Weight per metre 0.36 kg 35 mm
Chain between sweeps and bridles				
	2	Chain	Iron	Length 2.1 m Weight in air: 20 kg
Bridles				
	4	Upper bridle	Combination rope	Ø = 12 mm Length: 9.1 m Weight per metre 0.2 kg
	2	Lower bridle	Wire Rubber discs Lead weights with centre hole distributed evenly, every 40 cm	Ø = 10 mm Length 9.1 m Weight per metre 0.36 Ø 35 mm 22 pieces of 250 g each on each lower bridle
Chain in front of lower wing				
	2	Chain	Iron	Length 2.1 m Weight in air: 20 kg
Floats				
	(11)	Floats	(4 litre (same as 8") plastic floats)	Total buoyancy: 38.5 kg (equivalent to 11 pcs. of 200 mm plastic floats)

Headline and Fishing line				
	1	Headline	Combination rope, stainless	Ø = 12 mm Length 34.16 m incl. extension Weight per metre 0.2 kg
	1	Fishing line	Combination rope, stainless Chain weight	Ø = 12 mm Length 37.70 m incl. extension and weight Weight per metre 0.2 kg Length 2.1 m Weight in air 20 kg
Footrope				
		Centre Wire	Stainless steel wire	Ø = 9.5 mm Weight per metre 0.34 kg
	108	Rubber discs	Rubber discs with side hole	100 mm
		Filling the space between rubber discs	Plastic or rubber tube Rubber discs on each side of rubber disc 28 pcs. of lead, (1 every 3rd space)	Ø = 12 mm/14 mm 35 mm 250 g each piece
		Rope to mount the gear	Danline mounted in bights on the fishing line and through the rubber discs.	Ø = 12 mm The size of the bights makes the footrope disc periphery hang 4 cm below the fishing line
Attachments				
		Lazy deckie	No standard	
		Tackle strop	No standard	

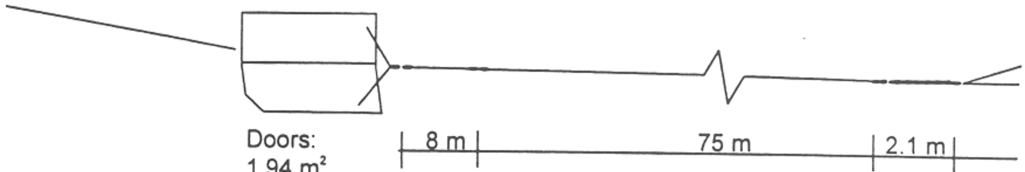


Trawl : TV3 520 # 80 mm full mesh
Type : ICES International Baltic Fish Survey Traw
Company :
Ship : Small vessels
File : F529 520-80 ICES TV3.ctf
Date : 16-12-1999   Design :

TV3, 520#
Construction details
Not to scale



1



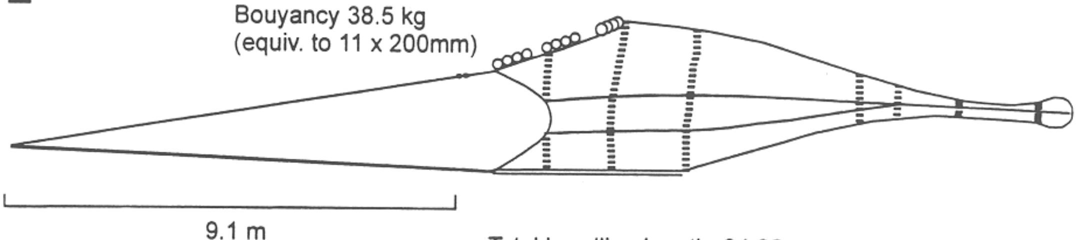
Doors:
1,94 m²,
cambered
V-doors
235 kg

Sweeps:
10 mm wire
with 35mm
rubber discs

Chain:
20 kg

2

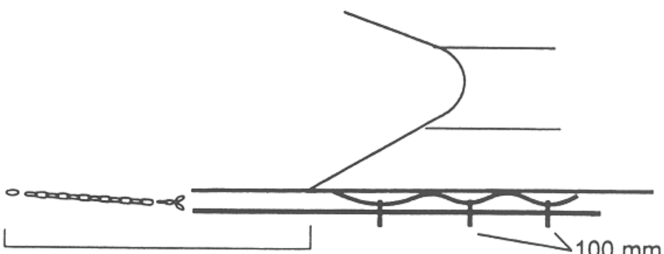
Floats:
Bouyancy 38.5 kg
(equiv. to 11 x 200mm)



Bridles:
Top: 12 mm combirope
Bottom: 10 mm wire
with 35 mm rubber discs and 250 g lead pieces every 40 cm

Total headline length: 34.06 m
Total fishing line length (incl. wingend chain): 37.70 m

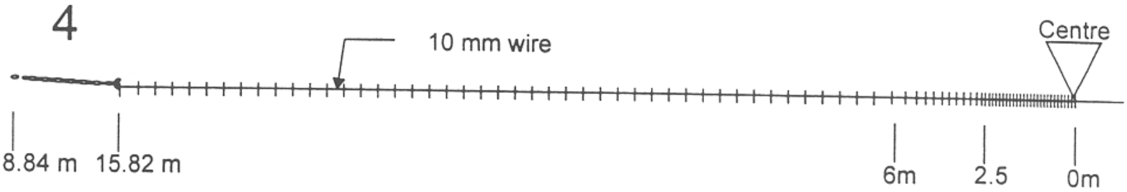
3



Wingend weight
20 kg

100 mm rubber discs with side hole. Line through hole tied up to fishing line

4



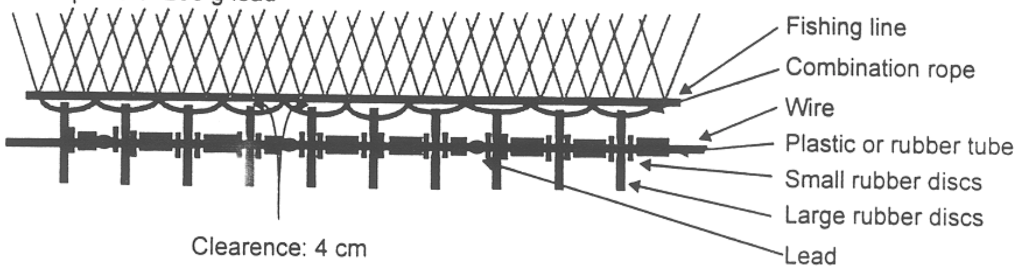
0 - 2.5 m: 100 mm rubber disks with side hole, 100 mm distance

2.5 - 6 m: 100 mm rubber discs with side hole, distance gradually increasing from 100 mm to 500 mm

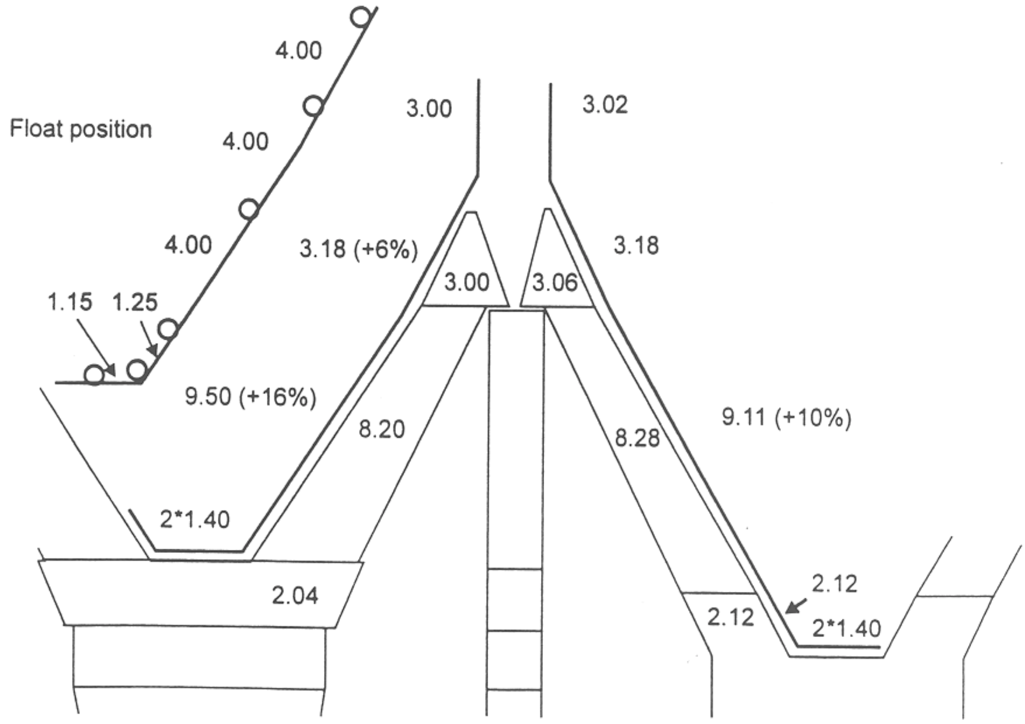
0 - 6 m: Ø: 12/14 mm rubber or plastic tube filling all the space between the large discs. For every 3rd space a piece of 250 g lead

6 - 15.8 m: 100 mm rubber discs with side hole, 500 mm distance

6 - 15.8 m: Ø: 12/14 mm rubber or plastic tube filling all the space between the large discs. For every 4th space a piece of 250 g lead



5 Framing rope and netting lengths, float position



6 Cutting of centre panel and assembly with top and lower wing

A cut is made into the centre of the side panel, 6 meshes 'deep'. A bosom of 4 meshes. The cut in the wings are started here with the cutting rates corresponding to those in the wings.