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Report of the Baltic International Fish Survey Working Group (WGBIFS)

31 March-4 April 2008

Gdynia, Poland

ICES International Council for the Exploration of the Sea

CIEM Conseil International pour l'Exploration de la Mer

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Executive summary

Highlights

- On request from the WGBFAS it was demonstrated that the survey stratification and coverage were sufficient to taking into account the different geographical distribution of cod in the spring and autumn season and does therefore in both cases produce un-biased indices. (Section 2.2.3).
- It was agreed to request ICES to calculate a combined index for cod based on the Solea survey in the western Baltic area and the Havfisken survey in the same area. The method for calculation of the index shall be the same as the method used for the BITS on Eastern cod. Updates of the new index as well as the old separate indices will be available for the WGBFAS.
- First trial combining trawling and acoustic integration shows significant amount of cod in the water column implying that the assumption of "zero-catches" if the oxygen concentration just above the bottom is measured to be below 0.5 ml/l will lead to bias in the indices calculations.

The Baltic International Fish Survey Working Group (WGBIFS) meeting took place in Gdynia, Poland, and considered Terms of Reference. Results of the acoustic surveys in May and October 2007 and of the trawl surveys in November 2007 and spring 2008 were also discussed. It was recommended that the results of the trawl surveys could be used for the stock assessment without any restrictions because the planned and realized hauls corresponded well. Changes of the position were only necessary in a small number of stations due to wrecks, rocky bottom, gillnets etc.

1 Opening of the meeting

The meeting took place in Gdynia, Poland from 31 March to 4 April. The meeting was opened by the chair at 10 am. Dept. director Dr. Steve Karnicki (SFI) and Dr. Włodzimierz Grygiel (SFI) welcomed the participants and the latter informed the participants about the house rules. Everybody looked happy and was looking forward to attack the coffee table and screen the selection of biscuits offered at the coffee brake coming up.

The Terms of Reference for the meeting were:

2007/2/LRC08 The **Baltic International Fish Survey Working Group** [WGBIFS] (Chair: Henrik Degel*, Denmark) will meet in Gdynia, Poland from 31 March–4 April 2008 to:

a) combine and analyse the results of the 2006 acoustic surveys and experiments and report to WGBFAS;
b) update the hydro-acoustic databases BAD1 and BAD2 for the years 1991 to 2007;
c) plan and decide on acoustic surveys and experiments to be conducted in 2008 and 2009 to increase survey catchability of fish;
d) discuss the results from BITS surveys performed in autumn 2007 and spring 2008;
e) plan and decide on demersal trawl surveys and experiments to be conducted in autumn 2007 and spring 2008; update and correct the Tow Database;
f) review and update the Baltic International Trawl Survey (BITS) manual;
g) review and update the Baltic International Acoustic Survey (BIAS) manual;
h) study the vertical distribution of the cod during the BITS survey in a situation with oxygen deficiency close to the bottom;
i) discuss the extension of the DATRAS data in time and space;
j) report to WGBFAS on the following issues:

i) Perform an evaluation of tuning data compilation for BITS autumn survey, taking into account possible cod distribution differences during spring and autumn surveys (e.g. pre-spawning season and feeding season in homothermic conditions). Is it appropriate for autumn surveys to apply the same calculation procedure for survey index estimation by ages and years as for spring survey?

ii) Perform an evaluation of tuning data available for the Kattegat cod assessment in order to explore the possibility of combining the indices that could potentially result in fewer, but more consistent time series. Taking into account possible spatial distribution differences between spawning (i.e. first quarter of the year) and non-spawning periods.

iii) Evaluate the BITS first quarter surveys in the western Baltic (RV "Havfisken" and RV "Solea") in order to explore the possibilities to establish only one tuning index for the cod stock assessment in this area.

iv) provide WGBFAS for the herring stock assessment in the Central Baltic (SD 25-27, 28.2, 29 and 32) with the following area corrected acoustic time series at least back to 1991:

- tuning fleet index by age (numbers in millions)
- biomass estimates by age and SD (t)
- 0-group estimates (numbers in millions).

2 Adoption of the agenda

The agenda was presented in the form of the time schedule based on the TOR. The schedule was agreed by all participants.

3 Combine and analyse the results of the 2007 acoustic surveys and experiments and report to WGBAFS

3.1 Combined results of the Baltic International Acoustic Surveys (BIAS)

In 2007 the following acoustic surveys were conducted between September and November:

Vessel	Country	Area
Argos	Sweden	27, 30 and parts of 25, 28, 29
Atlantniro	Russia	Parts of 26
Baltica	Poland	Parts of 24, 25 and 26
Baltica	Latvia/Poland	Parts of 26 and 28
Baltica	Estonia/ Finland/ Poland	Parts of 28, 29 and 32
Darius	Lithuania	Part of 26
Solea	Germany/Denmark	21, 22, 23, 24

Stock indices of herring and sprat by age groups of the different cruises are stored in the database BAD1. The cruise reports are presented in Annex 5 using the suggested standard format (ICES CM 2002/G:05 Ref. H, Annex 5)

3.1.1 Area under investigation and overlapping areas

Each statistical rectangle of the area under investigation was allocated to one country during the meeting in 2005, thus each country has a mandatory responsible area. That means that area shall be investigated by about 60 miles and at least two control hauls. However, it is allowed for all nations to cover also other areas, but it is the results from the responsible country that are used . Six rectangles were investigated by more than one vessel (Figure 3.1 and Table 3.1.10 and 3.1.11) during the international acoustic survey in October 2007. The figure illustrates that the planned coverage of the Baltic Sea during the acoustic survey in October was realized.

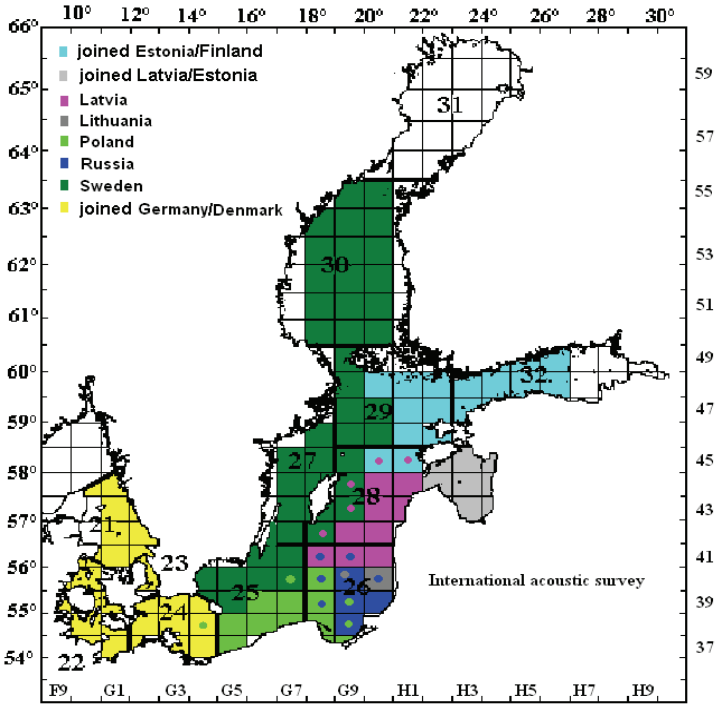


Figure 3.1: Map of surveys conducted in October 2007. Colours indicate the countries, which covered specific ICES-rectangles and delivered data to BAD1-database, thus was responsible for this rectangle. Coloured dots within a rectangle explain additional data in BAD1 partly or totally covered by other countries.

3.1.2 Total results

The stock indices which are based on the international acoustic survey in October 2007 are presented per rectangle and age group in Tables 3.1.1 to 3.1.2. The abundance estimates for herring and sprat are presented in Tables 3.1.3 and 3.1.4 per subdivision and age group. The corresponding biomass estimates of herring and sprat are given in the Tables 3.1.5 and 3.1.6, respectively. The overlapping areas were treated as described in Section 3.1.1.

3.1.3 Area corrected data

During WGBIFS meeting 2006 possible improvement of presenting the results from acoustic surveys was discussed, and correction factor for each subdivision and year was introduced because of the coverage of the investigated area differed in the years. This factor is the proportion between the total area of the subdivision that are presented in the BIAS manual (see table 2.2 in BIAS manual) and the area of rectangles which was covered during the survey. Some disagreements appeared about the appropriate area of SD28. It was agreed that the Bay of Riga must be excluded from the total area of SD 28. All other subdivision kept their areas from the manual. The calculated factors for 2007 are given in Table 3.1.7 by subdivision. The area corrected abundance estimates for herring and sprat per subdivision are summarised in Tables 3.1.8 and 3.1.9, respectively.

3.1.4 Tuning fleets for WGBFAS

3.1.4.1 Sprat in subdivisions 22-32

The following tuning fleets are used in the sprat assessment:

1) acoustic in subdivisions 22–29

2) acoustic in subdivisions 26 and 28

3) acoustic in subdivisions 26 and 28, age group 0 only.

The results of both tuning fleets in 2007 are shown in Table 3.1.12 and 3.1.13 (including the results for the period 1991–2006). In this tables the above explained correction factor is included (see 3.1.3).

The whole time series (1991–2006) for all fleets can be seen in Annex 4 (table 1-3).

3.1.4.2 Herring in subdivsions 25-29 + 32 (excluding Gulf of Riga)

Only one tuning fleet is applied from the October acoustic survey for the herring assessment of the Stock in Central Baltic. The area corrected combined results of Subdivisions 25–29, 2007 are presented in Table 3.1.15. The historical data with area corrected values can be found in Annex 4, Table 4.

WGBIFS recommends that the area corrected data from 2007 can be used in the assessment of the herring and sprat stocks in the Baltic Sea without any restrictions.

Table 3.1.1. Estimated numbers (millions) of herring October 2007 by rectangle.

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	41G0		2	2	0						
21	41G1		4	2	2	0					
21	41G2		102	60	40	1	0	0			
21	42G1		47	27	20	0	0	0			
21	42G2		34	26	7	0		0			
21	43G1		304	123	153	23	4	2			
21	43G2		3	3	0						
21	44G0		16	13	2						
21	44G1		63	54	10						
22	37G0		25	25	0						
22	37G1		448	447	2						
22	38G0		186	186	1			0			
22	38G1		70	70	0						
22	39F9		2	2							
22	39G0		14	13	1	0					
22	39G1		0								
22	40F9		2	2							
22	40G0		29	29							
22	40G1		11	11							
22	41G0		5	5							
23	39G2		224	203	16	2	1	1	1	0	0
23	40G2		351	16	101	113	42	38	26	5	3	6
23	41G2		28	27	1	0	0	0	0		
24	37G2		82	65	14	1	1	1	1	0	0	0
24	37G3		142	134	1	1	2	2	1	1	0	0
24	37G4		220	127	25	21	13	14	10	3	5	2
24	38G2		521	412	71	13	8	8	6	1	1	0
24	38G3		411	277	70	21	15	14	10	2	2	0
24	38G4		298	154	38	34	21	21	16	5	8	2
24	39G2		398	361	29	3	2	3	1	0	0	0
24	39G3		370	136	99	48	31	27	17	6	5	1
24	39G4		195	34	50	40	26	22	12	5	4	1
25	37G5		359	3	55	57	28	64	104	19	18	11
25	38G5		439	63	51	58	33	68	108	23	21	14
25	38G6		514	20	73	75	39	92	143	32	26	16
25	38G7		130	25	6	16	13	19	27	8	8	8
25	39G4		2	1	0	0	0	0	0	0	0	0
25	39G5		104	11	13	18	9	23	19	5	3	3
25	39G6		747	22	117	112	59	131	203	45	37	21
25	39G7		486	92	65	61	39	73	101	21	18	15
25	40G4		378	18	12	45	69	64	86	49	20	14
25	40G5		463	5	6	23	88	83	130	49	47	32
25	40G6		166	36	14	25	20	29	25	9	5	2
25	40G7		100	13	11	24	15	17	17	3	0	1
25	41G6		41	15	6	7	4	2	5	1	0	1
25	41G7		243	1	10	27	19	40	97	20	12	18
26	37G8		56	3	5	6	5	7	12	6	6	6
26	37G9		6	1	1	1	0	1	1	1	1	0
26	38G8		413	34	39	44	35	47	89	40	40	46
26	38G9		259	39	21	34	19	39	46	25	19	17
26	39G8		403	11	41	42	39	47	94	43	40	47
26	39G9		333	14	17	30	24	68	92	32	28	27
26	39H0		165	155	3	1	1	1	3	0	0	0
26	40G8		712	41	130	87	46	79	177	62	54	37
26	40G9		397	18	31	35	33	77	115	36	26	26
26	40H0		333	8	28	32	91	83	37	33	12	8
26	41G9		464	23	29	56	36	106	146	38	12	19
26	41H0		501	11	25	37	21	97	165	54	30	62

27	42G6	172	44	12	20	9	16	44	3	16	8
27	42G7	44	17	4	5	3	7	6	1	0	0
27	43G7	899	22	59	243	63	180	246	56	25	5
27	44G7	441	359	37	27	3	9	6	1	0	0
27	44G8	210	31	52	75	0	31	16	3	1	1
27	45G7	1663	468	557	422	65	16	129	6	0	0
27	45G8	296	191	31	34	9	8	16	5	1	0
27	46G8	423	259	47	49	3	30	30	0	3	0
28	42G8	208	1	5	23	18	49	77	24	6	5
28	42G9	167	4	5	20	17	37	49	17	11	6
28	42H0	539	13	10	69	46	117	158	61	36	30
28	43G8	85	3	8	20	15	10	17	7	2	2
28	43G9	905	5	21	98	89	260	309	72	21	30
28	43H0	1230	12	51	154	81	337	387	128	35	45
28	43H1	32	0	4	9	5	6	7	1	0	0
28	44G9	1391	63	153	300	273	223	326	50	0	4
28	44H0	473	1	45	124	85	100	97	16	1	3
28	44H1	87	0	6	21	18	21	17	3	1	0
28	45G9	612	45	29	138	70	108	152	41	25	5
28	45H0	443	4	22	93	62	78	146	20	7	11
28	45H1	498	22	35	109	65	79	153	18	7	9
29	46G9	744	516	49	68	45	33	34	0	0	0
29	46H0	598	108	140	116	43	109	58	22	2	0
29	46H1	351	48	49	78	33	28	82	17	9	7
29	46H2	112	55	20	18	5	3	10	2	0	0
29	47G9	1741	1255	134	169	46	57	75	4	0	0
29	47H0	550	367	43	81	27	15	17	0	0	0
29	47H1	2343	949	297	415	141	103	335	61	22	20
29	47H2	1189	117	357	348	83	47	193	31	8	6
29	48G9	2532	1290	386	269	88	131	257	66	15	30
29	48H0	2833	1844	207	283	100	73	243	45	21	17
29	48H1	5251	1392	901	1151	376	262	888	162	66	54
29	48H2	903	416	205	154	31	15	68	10	2	2
29	49G9	1200	852	243	29	28	17	27	0	0	4
30	50G7	803	159	289	73	66	24	94	19	2	76
30	50G8	1490	1	674	472	69	49	120	23	3	79
30	50G9	1045	34	124	212	114	115	222	48	95	82
30	50H0	1790	0	924	591	69	44	114	30	14	3
30	51G7	2263	0	438	497	128	226	834	7	48	84
30	51G8	1273	0	639	471	56	21	61	19	2	4
30	51G9	704	0	48	165	47	59	232	55	11	86
30	51H0	785	2	41	225	54	58	249	71	30	55
30	52G7	967	0	32	48	70	55	370	153	35	204
30	52G8	1663	52	29	67	251	105	617	197	102	244
30	52G9	1078	0	171	156	47	88	313	83	58	160
30	52H0	737	31	315	282	4	35	47	7	7	9
30	53G7	455	2	296	122	20	5	7	2	0	0
30	53G8	1377	0	143	99	162	171	288	173	80	261
30	53G9	1169	4	192	94	60	25	223	86	87	399
30	53H0	529	5	42	64	58	46	114	79	15	105
30	54G8	1136	87	83	184	78	74	376	106	34	115
30	54G9	969	0	29	159	83	88	295	68	106	141
30	54H0	1213	0	126	275	215	61	294	105	41	96
30	55G9	914	4	407	269	73	62	53	27	7	13
30	55H0	602	37	326	130	25	15	50	6	5	8
32	47H3	1368	108	268	347	51	64	496	15	10	9
32	48H3	2114	419	510	453	44	61	600	11	7	8
32	48H4	883	31	218	235	23	35	329	6	4	2
32	48H5	219	27	46	53	5	8	77	1	1	1
32	48H6	377	175	58	56	2	6	78	0	0	0
32	49H6	201	0	57	56	3	7	78	0	0	0

Table 3.1.2. Estimated numbers (millions) of sprat October 2007 by rectangle.

SD	rect	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	41G0	18		14	2	1		0			
21	41G1	8		6	1	1	0	0			
21	41G2	118	15	79	9	13	1	0			
21	42G1	88	0	81	3	3	1	0			
21	42G2	142	2	56	21	51	10	2			
21	43G1	159		90	14	43	9	2			
21	43G2	7	0	6	1	1	0	0			
21	44G0	43	0	36	5	2	0	0			
21	44G1	171	1	143	20	7	1	0			
22	37G0	2	0	1	0	0	0	0			
22	37G1	418	55	268	24	47	21	3			
22	38G0	48	15	27	2	2	1	0			
22	38G1	0									
22	39F9	39	37	2	0	0	0				
22	39G0	5	2	2	0	1	0	0			
22	39G1	52	0	26	5	17	3	1			
22	40F9	0	0	0	0						
22	40G0	4	2	3	0						
22	40G1	2	1	1	0						
22	41G0	1	0	0	0						
23	39G2	62	3	48	6	4	1	0	0		
23	40G2	131	1	81	32	13	4	0		0	
23	41G2	8	6	2	0						
24	37G2	569	48	433	51	31	4	1	0		
24	37G3	425	202	197	21	4	0	0			
24	37G4	670	148	443	51	23	3	1			
24	38G2	627	113	399	56	47	9	2	0		
24	38G3	1746	82	1322	178	133	23	8	0		
24	38G4	1147	73	900	105	58	7	4			
24	39G2	111	6	85	11	7	1	1	0		
24	39G3	1368	10	839	195	254	56	12	2		
24	39G4	494	1	283	78	104	23	5	1		
25	37G5	64	1	26	10	6	13	6	2		
25	38G5	408		196	66	32	69	37	8		
25	38G6	223	10	114	36	15	29	16	3		
25	38G7	57	1	36	10	3	4	3	1		
25	39G4	242	0	160	55	0	15	2	4	0,0	6
25	39G5	1109	0	774	149	25	119	14	14	7,2	6
25	39G6	232	3	122	39	16	31	17	4		
25	39G7	250	3	140	42	16	28	16	4		
25	40G4	193	6	52	19	11	29	32	5	1	38
25	40G5	29	0	8	4	1	10	3	2	0	1
25	40G6	383	5	136	51	20	93	40	12	21	4
25	40G7	418	1	198	57	5	134	11	5	6	0
25	41G6	1851	34	739	101	0	561	332	0	7	77
25	41G7	18	0	5	1	0	8	2	0	0	0
26	37G8	5	0	3	1	0	0	0	0	0	0
26	37G9	1579	1309	149	83	23	13	1	2	0	0
26	38G8	26	1	13	6	3	2	0	0	0	0
26	38G9	2834	275	1538	617	83	287	29	2	0	4
26	39G8	89	0	48	22	11	6	2	0	0	0
26	39G9	1141	4	447	417	37	181	45	6	1	4
26	39H0	3965	1280	1459	807	70	302	35	12	0	0
26	40G8	180	0	82	42	26	21	7	3	0	0
26	40G9	524	5	231	131	29	98	19	2	2	7
26	40H0	1732	27	355	225	602	335	47	63	49	31
26	41G9	178	13	32	50	12	37	15	12	3	2
26	41H0	178	4	18	62	15	44	17	12	4	1

27	42G6	440	3	375	13	1	37	10	0	0	0
27	42G7	125	3	55	8	3	32	12	3	4	6
27	43G7	1033	3	427	127	54	303	103	3	0	12
27	44G7	1471	281	384	316	32	287	120	4	9	38
27	44G8	382	7	67	112	24	101	65	0	0	4
27	45G7	1318	590	209	129	21	252	69	9	1	39
27	45G8	2629	344	973	560	5	513	197	0	21	16
27	46G8	1514	59	207	299	80	440	228	80	37	84
28	42G8	9	0	1	2	1	3	2	0	0	0
28	42G9	19	1	9	2	1	3	1	1	0	0
28	42H0	613	29	109	176	26	162	81	11	14	7
28	43G8	1164	40	365	39	64	527	68	35	0	27
28	43G9	270	3	59	48	5	89	37	22	4	2
28	43H0	553	0	56	120	74	182	78	26	3	15
28	43H1	6391	31	2785	1436	467	1442	62	131	31	62
28	44G9	1015	35	205	242	61	231	104	46	10	80
28	44H0	973	5	156	248	121	280	109	31	5	19
28	44H1	5464	16	2099	1283	375	1363	170	75	15	68
28	45G9	114	19	50	14	3	20	4	0	1	3
28	45H0	3663	10	926	853	302	946	471	62	18	75
28	45H1	13640	35	3296	3316	1126	3590	1834	210	40	192
29	46G9	1750	677	419	321	6	144	130	0	0	53
29	46H0	1710	320	446	319	46	408	134	13	10	15
29	46H1	10152	339	4318	1329	728	2441	908	4	7	80
29	46H2	5247	115	2316	715	373	1186	475	3	6	57
29	47G9	1538	1153	108	35	15	114	91	9	5	8
29	47H0	5433	1496	1922	668	83	679	425	17	56	87
29	47H1	3169	1088	904	268	157	525	192	4	6	27
29	47H2	3678	158	1643	464	249	816	307	3	5	32
29	48G9	1879	1218	286	111	28	129	89	9	0	11
29	48H0	4526	2382	1105	268	124	431	185	5	6	19
29	48H1	6706	1707	2463	609	326	1087	420	10	15	69
29	48H2	17210	609	8350	2225	1064	3476	1365	8	12	101
29	49G9	232	153	26	11	0	21	18	0	0	3
30	50G7	999	0	159	47	53	254	377	37	0	72
30	50G8	180	1	13	5	0	34	48	13	3	64
30	50G9	32	0	1	1	0	9	11	0	1	9
30	50H0	13	0	0	0	0	3	4	0	0	5
30	51G7	318	0	27	27	12	66	154	0	0	32
30	51G8	660	0	110	21	0	123	262	31	11	102
30	51G9	29	0	1	1	0	7	6	1	2	11
30	51H0	125	0	3	5	0	36	29	11	1	38
30	52G7	142	0	34	0	0	36	46	0	0	26
30	52G8	180	2	63	8	0	28	60	4	3	11
30	52G9	61	0	3	0	0	10	15	1	1	30
30	52H0	635	0	61	36	0	114	293	11	5	115
30	53G7	170	0	46	0	0	55	27	5	0	36
30	53G8	79	0	6	2	0	14	24	5	2	27
30	53G9	131	0	7	1	0	28	34	3	0	58
30	53H0	83	0	2	0	0	17	24	1	6	33
30	54G8	84	0	26	0	2	9	15	4	0	28
30	54G9	0	0	0	0	0	0	0	0	0	0
30	54H0	67	0	7	1	0	17	35	1	0	6
30	55G9	276	0	21	0	12	25	78	3	37	100
30	55H0	2431	0	464	0	0	757	1012	9	32	157
32	47H3	1361	488	372	223	48	136	65	8	7	14
32	48H3	16718	981	4917	4241	1021	3674	1430	135	83	237
32	48H4	9072	52	3628	2309	480	1691	779	38	24	72
32	48H5	4279	46	1772	1075	209	745	373	16	13	30
32	48H6	4329	197	1320	1151	231	921	407	29	22	51
32	49H6	2953	15	1018	790	160	616	280	21	16	37

Table 3.1.3. Estimated numbers (millions) of herring October 2007

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	575	311	234	25	4	2				
22	793	789	3	0		0				
23	604	246	118	115	44	40	27	5	3	6
24	2637	1699	396	183	120	112	73	23	26	6
25	4173	327	440	546	435	704	1067	282	216	155
26	4041	357	369	404	350	651	977	370	267	296
27	4148	1391	800	875	157	298	493	75	46	15
28	6668	173	394	1176	845	1426	1894	458	151	152
29	20347	9209	3032	3178	1045	891	2286	420	147	140
30	22963	419	5369	4655	1748	1428	4975	1365	782	2223
32	5162	761	1157	1200	128	182	1658	35	23	19

Table 3.1.4. Estimated numbers (millions) of sprat October 2007

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21	755	18	511	77	122	22	5	0	0	0
22	571	113	330	31	68	26	4	0	0	0
23	201	10	131	38	17	4	1	0	0	0
24	7155	683	4902	747	662	127	33	3	0	0
25	5477	64	2706	641	150	1143	531	65	43	132
26	12429	2919	4375	2462	910	1325	216	115	58	49
27	8911	1291	2697	1564	220	1966	803	100	71	198
28	33887	225	10116	7779	2626	8838	3020	650	140	550
29	63231	11416	24305	7344	3198	11458	4737	85	126	562
30	6694	2	1055	154	80	1643	2554	142	103	960
32	38711	1779	13028	9788	2149	7783	3333	247	164	440

Table 3.1.5. Estimated biomass (in tonnes) of herring October 2007.

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21 Total	20937,1	6850,1	11274,7	2182,8	484,4	145,2	0,0	0,0	0,0	0,0
22 Total	6767,3	6647,3	102,6	10,6	0,0	5,9	0,0	0,0	0,0	0,0
23 Total	39106,7	2769,2	6938,7	10852,0	5036,1	5816,2	4546,7	1143,1	666,3	1339,0
24 Total	68966,8	15985,5	13958,1	11172,4	8682,6	8132,2	5476,1	2144,6	2564,2	850,0
25 Total	194527,9	3998,2	15521,2	25392,7	24744,1	33644,7	50947,6	16610,7	13169,3	11049,2
26 Total	170885,3	3925,3	11649,1	17194,3	15635,6	26972,6	41876,7	18834,7	14957,8	19870,3
27 Total	74685,9	7372,2	12257,9	18856,8	4150,9	9187,7	15379,2	2711,0	1793,4	723,3
28 Total	198508,5	1272,5	7956,3	29437,1	22312,6	45974,5	63447,3	18615,7	6558,8	6913,9
29 Total	277686,5	40380,8	44231,2	58429,0	21915,3	20664,5	51299,6	9930,8	4105,4	4398,8
30 Total	590927,4	1614,3	68473,6	85130,0	39301,6	34074,4	135384,6	42692,3	26807,0	101670,6
32 Total	78463,4	3988,0	16729,5	20570,5	2756,2	3550,1	29015,8	803,0	533,4	517,1
Grand Tot	**1721463**	**94803**	**209093**	**279228**	**145019**	**188168**	**397374**	**113486**	**71156**	**147332**

Table 3.1.6. Estimated biomass (in tonnes) of sprat October 2007.

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21 Total	10849,5	73,0	6286,6	1335,0	2538,2	506,9	110,9	0,0	0,0	0,0
22 Total	6317,2	477,4	3853,1	433,4	1063,4	421,9	67,1	0,0	0,0	0,0
23 Total	2788,7	50,5	1683,3	609,1	333,0	88,4	17,1	0,6	6,1	0,0
24 Total	89519,8	3909,1	61219,8	10618,2	10944,1	2254,5	523,8	54,8	0,0	0,0
25 Total	67711,9	287,2	29247,5	8497,5	2309,9	15757,4	7201,6	1057,0	726,5	1943,8
26 Total	116804,7	9889,0	46420,9	28395,0	10255,7	16186,5	2812,9	1487,9	739,1	654,8
27 Total	78738,4	3722,8	22096,7	14839,9	2262,7	22806,7	9120,1	1218,1	926,9	2559,8
28 Total	352003,8	910,4	98302,7	80402,3	27145,9	97124,0	33859,4	7843,3	2014,8	6861,6
29 Total	493660,7	35270,3	196258,0	65822,5	31094,6	111275,2	44256,9	1021,7	1492,5	6549,4
30 Total	78630,4	6,9	9761,4	1578,4	911,3	19323,7	30336,7	1799,0	1353,0	13728,0
32 Total	327300,2	5569,8	102792,3	86218,8	19677,4	73333,8	30286,1	2725,2	1861,2	4835,4
Grand Total	**1624325**	**60166**	**577922**	**298750**	**108536**	**359079**	**158593**	**17208**	**9120**	**37133**

Table 3.1.7. Calculated correction factor for 2007 per Subdivision.

SD	AREA COVERED	AREA*	CORR. FACTOR
21	4604.6	4604.6	1
22	3389.7	3459.6	1.020621294
23	367.2	367.2	1
24	5664.5	5664.5	1
25	11888.6	12277.1	1.032678364
26	9705.4	10828.9	1.115760298
27	6324.5	7783.8	1.230737608
28	10917.6	11060.7	1.013107276
29	9766.1	10154.2	1.039739507
30	15536.7	16409.6	1.056183102
32	4116.8	7497.2	1.821123202

*** Area; means all the surface area that corresponds to depths deeper than 10 m.**

Table 3.1.8. Corrected numbers (millions) of herring October 2007.

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21 Total	574.7	311.0	233.7	24.5	3.8	1.7	0.0	0.0	0.0	0.0
22 Total	809.1	805.2	3.5	0.2	0.0	0.2	0.0	0.0	0.0	0.0
23 Total	603.7	245.7	118.1	115.1	43.7	39.7	26.7	5.4	3.2	6.1
24 Total	2637.4	1699.0	395.9	182.8	120.0	111.8	72.8	23.1	25.6	6.4
25 Total	4309.5	337.3	454.8	564.1	449.5	727.4	1101.4	291.7	223.1	160.3
26 Total	4508.8	398.0	411.4	451.1	390.6	726.7	1090.0	412.6	298.1	330.2
27 Total	5105.3	1711.7	984.1	1076.5	192.8	366.9	607.1	91.8	56.3	18.0
28 Total	6755.7	175.5	398.8	1191.8	856.2	1444.2	1918.4	464.0	153.2	153.6
29 Total	21156.0	9575.1	3152.0	3304.2	1086.2	926.4	2376.9	437.0	152.4	145.7
30 Total	24253.3	442.6	5670.9	4916.3	1845.8	1507.7	5254.5	1441.2	826.2	2348.1
32 Total	9401.5	1385.8	2106.7	2185.7	232.8	331.0	3019.4	62.9	41.6	35.5
Grand Tot	**80115**	**17087**	**13930**	**14012**	**5221**	**6184**	**15467**	**3230**	**1780**	**3204**

Table 3.1.9. Corrected numbers (millions) of sprat October 2007.

SD	total	age 0	age 1	age 2	age 3	age 4	age 5	age 6	age 7	age 8+
21 Total	754,7	18,1	511,2	76,8	122,4	21,6	4,7	0,0	0,0	0,0
22 Total	583,0	115,0	337,2	31,2	68,9	26,6	3,9	0,0	0,0	0,0
23 Total	200,9	10,5	130,6	37,6	16,9	4,3	0,8	0,0	0,2	0,0
24 Total	7155,3	683,3	4902,0	746,5	661,6	126,5	32,8	2,6	0,0	0,0
25 Total	5655,5	66,5	2794,6	661,9	155,2	1180,2	548,3	67,6	44,3	136,8
26 Total	13868,3	3256,4	4881,2	2747,0	1015,9	1478,7	241,1	127,8	65,1	55,1
27 Total	10967,1	1589,5	3318,9	1924,7	271,0	2419,7	988,8	122,6	87,7	244,1
28 Total	34331,0	228,1	10249,0	7880,8	2660,1	8953,9	3059,6	658,1	142,0	557,0
29 Total	65743,3	11869,3	25271,3	7635,7	3324,7	11912,9	4925,4	88,1	131,2	584,7
30 Total	7069,8	2,5	1114,4	162,9	84,5	1735,3	2697,3	149,8	109,1	1013,9
32 Total	70497,2	3240,1	23725,0	17826,0	3913,4	14173,5	6070,5	449,8	297,9	801,1
Grand Tot	**216826**	**21079**	**77235**	**39731**	**12295**	**42033**	**18573**	**1666**	**878**	**3393**

Table 3.1.10. Rectangles covered by two countries and results from each country. Estimated numbers (millions) of Herring.

VESSEL	SD	RECT	used or not	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
Ger	24	38G4	Used	11514	1354	1456	2106	1560	1823	1446	483	930	355
Pol	24	38G4	Not used	8860	1142	1854	851	880	472	1592	1678	392	0
Rus	26	38G9	Used	11913	439	721	1701	893	1733	2206	1572	1305	1344
Pol	26	38G9	Not used	20645	209	408	2147	2453	2663	3745	2605	2604	3811
Swe	25	39G5	Used	10887	129	159	322	84	510	363	28	10	11
Pol	25	39G5	Not used	41104	839	6978	6309	3138	7192	11474	2212	1964	998
Rus	26	39G8	Not used	10803	176	577	1063	783	1974	1985	1447	996	1802
Pol	26	39G8	Used	20205	126	1353	1992	2262	2412	4268	2349	2221	3223
Rus	26	39G9	Used	17914	146	590	1572	1302	3252	4888	2045	1827	2291
Pol	26	39G9	Not used	15903	237	935	1846	1859	1903	3433	1685	1994	2012
Swe	25	40G7	Used	10074	175	120	561	238	279	283	7	0	0
Pol	25	40G7	Not used	33217	142	4563	5132	3294	5934	8913	2143	1857	1241
Rus	26	40G8	Not used	28982	199	1271	2335	1667	6363	7754	3283	2279	3831
Pol	26	40G8	Used	26279	540	4063	3169	1969	2938	6692	2509	2475	1924
Lit	26	40G9	Not used	14181	11	90	1259	3123	4809	2098	2012	278	486
Rus	26	40G9	Used	18294	214	1057	1639	1465	3287	5348	1981	1521	1781
Est	28	45H0	Used	11175	26	429	2074	1486	2018	3921	620	224	379
Lat	28	45H0	Not used	5445	29	276	1128	585	1169	1748	329	81	98
Est	28	45H1	Used	11641	125	651	2318	1509	2003	3969	546	198	321
Lat	28	45H1	Not used	332	1	20	73	49	78	87	16	4	4
Est	29	47H0	Not used	7875	7442	153	94	30	19	75	26	15	22
Swe	29	47H0	Used	302263	134407	1849	6520	722	235	297	0	0	0

Table 3.1.11. Rectangles covered by two countries and results from each country. Estimated numbers (millions) of Sprat.

VESSEL	SD	RECT	used or not	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
Ger	24	38G4	Used	14160	487	11237	1395	868	120	53	0	0	0
Pol	24	38G4	Not used	7428	8	4278	1883	509	588	67	95	0	0
Rus	26	38G9	Used	29649	1081	16530	7100	1006	3481	373	28	0	49
Pol	26	38G9	Not used	22803	52	12615	5777	2577	1333	321	128	0	0
Swe	25	39G5	Used	16166	0	9472	2456	423	2072	266	246	123	108
Pol	25	39G5	Not used	1330	10	606	217	110	246	106	36	0	0
Rus	26	39G8	Not used	21905	0	7900	6856	768	5015	637	539	0	191
Pol	26	39G8	Used	1057	1	546	259	136	84	26	7	0	0
Rus	26	39G9	Used	13866	21	5004	5147	523	2423	588	95	14	52
Pol	26	39G9	Not used	12763	0	6528	3188	1713	1021	203	110	0	0
Swe	25	40G7	Used	5345	3	2067	714	77	2036	180	91	96	0
Pol	25	40G7	Not used	327	2	140	55	32	64	24	10	0	0
Rus	26	40G8	Not used	4009	20	870	922	318	1325	435	43	36	39
Pol	26	40G8	Used	2271	2	956	505	359	304	104	42	0	0
Lit	26	40G9	Not used	19880	1867	6712	3513	4161	1261	594	1159	410	320
Rus	26	40G9	Used	6478	31	2675	1652	389	1305	253	38	35	101
Est	28	45H0	Used	38067	45	8680	8783	3143	10314	5205	736	232	932
Lat	28	45H0	Not used	20293	0	4197	4919	1743	6016	2508	474	0	437
Est	28	45H1	Used	141382	112	31901	34361	11694	38718	20010	2398	523	2265
Lat	28	45H1	Not used	207502	0	27189	49881	18231	61476	39417	1415	2317	7577
Est	29	47H0	Not used	23186	6985	7782	2091	1027	3565	1410	58	68	200
Swe	29	47H0	Used	37278	5133	15132	6011	833	7376	4483	197	617	1026

Table 3.1.12. Tuning fleet results 2007 for sprat (22–29)

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
2007	51885	21665	8174	26103	9801	1067	471	1578	120743

Table 3.1.13. Tuning fleet results 2007 for sprat (26 + 28)

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
2007	15130	10628	3676	10433	3301	786	207	612	44772

Table 3.1.14. Tuning fleet results 2007 for sprat on age 0 SD 26 + 28.

YEAR	AGE0
2007	3484

Table 3.1.15. Tuning fleet results 2007 for herring (25-29 + 32).

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
2007	7508	8774	3208	4523	10113	1760	925	843	37653

Historical tuning fleet tables for herring and sprat can be found in Annex 4.

3.2 Combined results of the 2007 Baltic Acoustic Spring Surveys (BASS)

In May–June 2007, the following acoustic surveys were conducted:

VESSEL	COUNTRY	ICES SUBDIVISION
Walther Herwig III	Germany	24, 25, 27
Atlantniro	Russia	Parts of 26
Baltica	Latvia–Poland	Parts of 26 and 28
Darius	Lithuania	Parts of 26

During late spring the sprat is concentrated in the deeper basins for spawning. Herring stays at this time primarily in shallow water areas close to coasts. The portion of herring is in most areas is much smaller than 10%. These numbers should not be used for a real investigation of abundance. Therefore, only the distribution of sprat is examined in farther. The estimated numbers per age group and ICES square are combined in Table 3.2.1.

The cruise reports are presented in the Annex 5 or Annex 9 if presented as working documents.

3.2.1 Area under investigation and overlapping areas

Each ICES statistical rectangle of the monitored area was allocated to one country (ICES, 2005), thus each country participate in the survey has a mandatory responsible area. All rectangles were acoustically investigated over about 60 miles and normally two hauls were realized in this area. However, it is allowed for all participants to cover also other areas, but the results from the responsible country were used in the final assessment. In 2007 only one rectangle (40G9) was investigated by two vessels (Table 3.2.6). On both ships the roughly same total number was estimated but the age structure was slightly different (see Table 3.2.6).

The planned investigation area was covered completely. Two rectangles, 37G5 (SD25) and 46G9 (SD27) were additionally examined. Figure illustrates the coverage of the Baltic Sea during the BASS surveys in 2007.

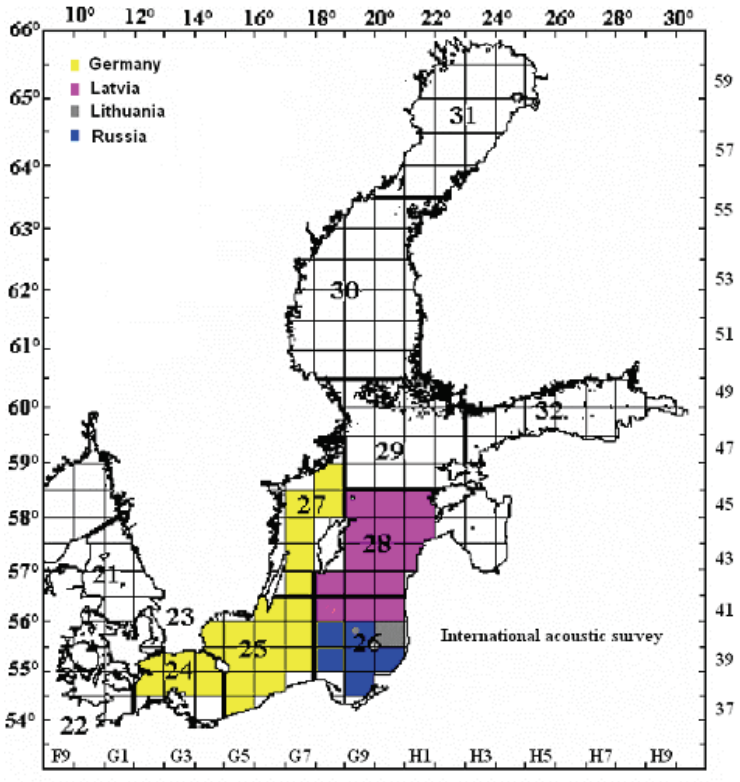


Figure 3.2.1. Map of BASS surveys conducted in May/June 2007. Colours indicate the countries, which covered particular ICES-rectangles and delivered data to BAD1-database, thus was responsible for this rectangle. Coloured dots within a rectangle explain additional data in BAD1-database partly or totally covered by other countries.

Combined results and area corrected data

The Baltic sprat stock abundance estimates per ICES Subdivisions and age groups are presented in Table 3.2.2.

During the WGBIFS 2006 meeting possible improvement of the results from acoustic surveys were discussed, and correction factor for each ICES Subdivision and year was introduced because of the coverage of the investigated area differed in the years. This factor is the proportion to the total area of the ICES Subdivision (see BIAS manual) and the area of rectangles covered during the survey. The correction factors, calculated by ICES Subdivisions for 2007 are given in Table 3.2.3. The area corrected abundance estimates for sprat per ICES Subdivision are summarised in Tables 3.2.4. The corresponding biomass estimates of sprat are given in the Table 3.2.5.

3.2.2 The Baltic sprat stock in 2007

The new 2007 corrected sprat abundance indices by age group are given in Table 3.2.7. The complete time series (1999 to 2007) of the corrected sprat abundance is given in Annex 4 table 5. The table is a simple update of last year's indices by adding 2007 values.

In 2007 the total quantity of 144 109 of sprat has reached the second lowest level since the beginning of the acoustic spring investigations in 1999. Principal reason is the low recruitment during the last years. The sprat stock is again dominated by the strong 2004 year class. A third of the total biomass was 4 years old. The abundance of young sprat has increased compared to the last three years and was above the mean.

WGBIFS recommends that the May/June 1999-2007 BASS data (Table 3.2.7) can be applied as additional source of data (fleet) for tuning in the final assessment of the Baltic sprat stock biomass.

3.2.3 Reference

ICES. 2005. Report of the Baltic International Fish Survey Working Group. ICES CM 2005/G:08, Ref.: D, H: 254 pp.

Table 3.2.1. Estimated abundance of sprat (millions) per age groups and ICES rectangle; May/June 2007.

ICES SD	ICES Rect.	Total	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8+
24	38G2	193.1	151.5	18.8	7.4	11.3	1.8	2.2	0.2	
24	38G3	609.7	478.4	59.2	23.2	35.6	5.7	6.9	0.7	
24	38G4	1051.6	552.3	170.2	92.8	163.2	41.8	27.8	3.6	
24	39G2	225.4	176.8	21.9	8.6	13.2	2.1	2.5	0.3	
24	39G3	585.0	459.0	56.8	22.3	34.2	5.5	6.6	0.7	
24	39G4	1194.7	931.4	127.9	34.0	76.1	16.6	7.1	1.5	
24	total	3859.4	2749.3	454.8	188.2	333.5	73.5	53.1	7.0	0.0
25	37G5	139.0	48.0	22.3	10.7	41.8	11.3	2.6	1.9	0.3
25	38G5	237.2	52.7	37.5	20.3	89.4	25.4	6.2	4.6	0.6
25	38G6	503.3	173.9	80.8	38.6	151.3	40.7	9.5	6.8	1.1
25	39G4	258.2	115.0	42.7	18.2	62.0	15.3	2.8	1.9	0.3
25	39G5	418.0	79.5	73.3	35.7	172.0	41.5	7.9	7.3	0.5
25	39G6	6601.1	1500.1	1330.7	526.3	2477.1	571.0	118.8	71.9	1.7
25	39G7	1494.7	237.5	323.2	128.4	647.4	118.9	24.2	15.2	
25	40G4	864.5	209.6	150.3	71.2	322.5	79.7	16.3	12.9	1.2
25	40G5	3944.7	740.5	739.9	333.6	1621.5	371.3	74.4	54.4	4.8
25	40G6	687.3	233.8	128.9	50.3	210.0	49.0	9.2	5.7	0.2
25	40G7	898.4	242.1	176.9	66.6	322.8	68.7	11.7	9.4	0.2
25	41G6	3635.8	1727.6	655.1	212.9	828.8	171.3	31.9	7.6	
25	41G7	2791.1	1844.4	370.6	100.5	376.8	79.7	15.1	3.8	
25	total	22473.4	7204.6	4132.1	1613.2	7323.3	1643.6	330.6	203.5	10.9
26	38G9	2950.4	1155.0	1057.7	76.2	552.9	86.4	15.4		6.8
26	39G8	1824.1	86.2	657.8	372.1	639.5	51.9	2.3	6.0	8.3
26	39G9	1555.1	398.9	538.9	71.2	492.1	42.5	6.2		5.2
26	39H0	3747.4	2582.8	887.6	69.5	187.9	19.7			
26	40G8	3153.7	79.5	896.2	353.1	1622.0	151.4	24.0	10.6	16.8
26	40G9	3958.8	608.7	876.1	210.1	1882.3	304.3	57.8		19.6
26	40H0	8176.2	4820.3	1018.1	201.2	1263.9	625.6	149.8	88.7	8.6
26	41G8	2158.4	393.0	544.5	129.6	812.4	202.3	21.0	13.8	41.7
26	41G9	6114.6	4167.7	713.6	141.9	913.4	160.2	10.9		7.0
26	41H0	6305.6	151.6	2760.3	257.4	2587.7	333.5	49.5	37.8	127.7
26	total	39944.3	14443.7	9950.8	1882.3	10954.2	1978.0	336.8	156.9	241.7
27	42G7	1887.1	1184.3	299.7	99.1	207.0	56.2	37.4	2.7	0.4
27	43G7	1714.0	615.1	289.0	180.9	425.4	108.9	78.0	13.0	3.4
27	44G7	1479.2	347.9	305.8	195.7	431.2	109.6	77.5	8.3	2.2

ICES SD	ICES Rect.	Total	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8+
27	45G7	1149.9	537.6	229.4	91.2	199.6	50.4	38.6	2.2	0.6
27	45G8	529.6	265.5	99.6	38.1	87.9	21.1	16.6	0.7	0.1
27	46G8	1119.3	371.4	262.1	110.4	257.6	67.5	46.7	2.6	0.9
27	total	7879.1	3321.6	1485.6	715.3	1608.8	413.7	294.8	29.4	7.6
28	42G8	2931.7	14.6	662.2	30.6	1098.8	855.2	134.7	30.6	105.0
28	42G9	2565.0	118.5	788.6	107.7	1199.0	243.8	51.1	21.7	34.5
28	42H0	8180.0	5485.9	1351.5	218.7	867.3	157.6	83.4	5.9	9.6
28	43G9	2606.7	559.7	792.1	129.9	940.5	132.5	19.2	5.2	27.7
28	43H0	2937.5	609.0	884.8	184.2	988.3	239.3	14.7		17.1
28	43H1	1716.6	1691.0	25.6						
28	44G9	9298.3	3038.1	2273.9	263.9	2906.1	736.5	79.8		
28	44H0	4329.0	1396.2	1047.7	118.3	1568.0	126.1	22.2	14.5	36.0
28	44H1	7527.6	6049.9	532.8	68.1	723.5	85.2	68.1		
28	45G9	5405.0	1651.1	1167.1	245.6	1945.1	315.5	26.9		53.8
28	45H0	6642.6	1901.8	1995.8	744.0	1671.8	246.7		16.2	66.3
28	45H1	4003.0	1355.8	333.9		1955.9	317.2		20.1	20.1
28	total	58142.9	23871.5	11855.9	2111.0	15864.3	3455.7	500.1	114.3	370.2

Table 3.2.2. Estimated abundance of sprat (million) per age groups and the ICES Subdivisions; May/June 2007.

ICES SD	TOTAL	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24	3859	2749	455	188	334	74	53	7	0
25	22473	7205	4132	1613	7323	1644	331	203	11
26	39944	14444	9951	1882	10954	1978	337	157	242
27	7879	3322	1486	715	1609	414	295	29	8
28	58143	23872	11856	2111	15864	3456	500	114	370
TOTAL	132299	51591	27879	6510	36084	7564	1515	511	630

Table 3.2.3. Calculated the correction factor of covered areas for May/June 2007 per ICES Subdivisions.

SD 24	1.235453
SD 25	1.075357
SD 26	1.100133
SD 27	1.389511
SD 28	1.041366

Table 3.2.4. Corrected abundance of sprat (million) May/June 2007.

ICES SD	TOTAL	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24	4768	3397	562	233	412	91	66	9	0
25	24154	7748	4443	1735	7875	1767	355	219	12
26	43944	15890	10947	2071	12051	2176	371	173	266
27	10945	4615	2064	994	2235	575	410	41	11
28	60548	24859	12346	2198	16521	3599	521	119	385
TOTAL	144360	56509	30363	7230	39094	8208	1722	560	674

Table 3.2.5. Estimated sprat biomass (in tonnes) of sprat May/June 2007.

ICES SD	TOTAL	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24	35764	21275	4966	2854	4643	1036	915	136	0
25	209849	47103	39054	16863	80205	19016	4105	2774	187
26	283535	67362	73447	16792	98562	19175	3449	1947	2801
27	53302	15156	10514	6446	14249	3762	2627	384	107
28	350186	93886	76938	15922	123802	29351	4779	1318	4192
TOTAL	932636	244782	204919	58877	321460	72341	15874	6559	7287

Table 3.2.6. Rectangl covered by two countries and estimated sprat biomass.

VESSEL	SD	RECT	TOTAL	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
ATL07*	26	40G9	3114	210	1238	332	1099	164	9	12	50
DAR07	26	40G9	3959	609	876	210	1882	304	58		20

***) Russia was responsible for acoustic investigations in the ICES rectangle 40G9, however also Lithuania covered this area in the May 2007 BASS survey**

Table 3.2.7. Corrected abundance (million) of the Baltic sprat stock resulted from the May 2007 BASS survey.

YEAR	TOTAL	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
2007	174676	68376	36739	8748	47304	9932	2084	678	816

4 Update of BAD 1

Check of the BAD1 database was carried out until the meeting of WGBIFS in 2007 which was not finalized by Sweden and Russia for some years (see Report 2007). Independent of this it was agreed during the meeting in 2007 that the current available data of BAD1 should be uploaded to FishFrame beforel the meeting in 2008. This uploading was realized in summer 2007. The data of BAD1 were stored into the AB and SD datasets of FishFrame.

The following adaptations of BAD1 data to FishFrame formats were necessary:

FishFrame does not contain the possibility to flag the dataset like in BAD1 which is used to describe the handling of the data (see report). FishFrame uses the number realized miles in the rectangle to combine the results of different vessels in the same rectangle. This possibility was used to transfer the flags of BAD1 into FishFrame because of number of miles is not available in BAD1. All datasets in BAD1 with a flag of 1 got the fixed number of 60 miles. Datasets with a flag of 0.5 got the fixed values of 30 miles and datasets with flag of 0 were not transformed into the FishFrame system. The used procedure results in similar stock indices based on both databases.

Data of version BAD_1_r11.XLS were transferred to FishFrame. Table 4.1 describes which data of BAD 1 were stored in the different filed of the AB dataset of FishFrame in case of herring data. Datasets of sprat were changed in the fields “Species” and “Number” where the TSN code of sprat and the data of sheet “AS” were used, respectively. Table 4.2 presents the transformation of BAD 1 into FishFrame data type SD.

It must be pointed out that very small differences between the stock indices estimated from FishFrame and BAD 1 are possible. The reason is that Bad1 stores the number of herring and sprat by age groups in number. FishFrame stores the total number of herring and the fraction of age groups. Therefore, the indices in number by age group in BAD 1 were transferred in fraction by age group. These data were uploaded to FishFrame. However, FishFrame stores only 6 digits for the fraction. Then the fractions are corrected in such a way that the sum of all age groups is equal to one, which was not necessarily the case due the reduction of digits of the estimates based on BAD 1.

Table 4.1. AB data exchange format of FishFrame

						Address
1	Recordtype	String	M		Fixed value AB	„AB“
2	Year	Integer	M	1900 to 3000	Year of start of survey	Sheet: ST Column :M
3	Ship	String	M	See Appendix I	Ship code	Sheet: ST Column :Q
4	Species	String	M	See Appendix I	TSN Code	161722
5	Statistical rectangle	String	M	See Appendix I	ICES rectangle (e.g. 41G9)	Sheet: ST Column :E
6	Sub Statistical rectangle	String	O	See Appendix I	Could be any kind of splitting of a statistical rectangle, e.g. depth strata	Sheet: ST Column :D
7	Biological subarea	String	O	See Appendix I, Note the special meaning of X		X
8	Number	Integer	M	0 - 4,000,000,000.0	Number of individuals for the given stratum	Sheet: AH Column :F
9	Milage	Dec(1)	M	0.1 - 1000.0	Approximate number of miles of survey (acoustic data) track used to estimate the abundance - e.g. Two transects - 60 Nm	Flag = 1: 60 Flag = 0.5: 30

Table 4.2. SD data exchange format of FishFrame

1	Recordtype	String	M		Fixed value AB	“SD”
2	Year	Integer	M	1900 to 3000	Year of start of survey	Sheet: ST Column :M
3	Ship	String	M	See Appendix I	Ship code	Sheet: ST Column :M
4	Species	String	M	See Appendix I	TSN Code	
5	Stock	Integer	M	See Appendix I		Sheet: ST Column :M
6	Age	Integer	M			Sheet: AS
7	AgePlusGroup	String	M	- or +	A plus group (+) refers to the age indicated AND older, respectively to a reading of more than or equal the specified number of rings	

8	Maturity	String	M	M, I	M = Mature, I = Immature	dummy
9	MaturityDetermination	String	M	A, M	A = Assumed, M = measured	dummy
10	StatisticalRectangle	String	O	See Appendix I	ICES rectangle (e.g. 41G9)	Sheet: ST Column :M
11	Sub Statistical rectangle	String	O	See Appendix I	Could be any kind of splitting of a statistical rectangle, e.g. depth strata	Sheet: ST Column :M
12	Biological subarea	String	O	See Appendix I, Note thew special meaning of X		
13	Fraction	Dec(9)	M	0.00000001 - 30,000	Proportion of number of fish	Sheet: ST Column :M
14	MeanWeight	Dec(6)	M	0.2 - 400	In grams	Sheet: WS
15	MeanLength	Dec(6)	M	30 - 4000	In mm	dummy

After uploading of the data stock indices by rectangles and ICES Subdivisions were calculated based on both databases. The results are similar taking into account the different accuracy of the calculation of both systems.

Actions to be taken:

The BAD 1 data of the acoustic survey in October 2007 will be uploaded to FishFrame by Rainer Oeberst immediately after the meeting of WGBIFS.

Furthermore, WGBIFS recommends that Sweden recalculates BAD 1 data before 2000 until end of 2008 and upload the recalculated data to FishFrame.

5 FishFrame (Acoustic)

History and objectives is found at the FishFrame websites (http://www.fishframe.org). The system is regarded as consisting of three stages:

- Stage I: Basic, disaggregated fisheries and acoustics data.
- Stage II: Data manipulation and aggregation tools.
- Stage III: Aggregated database and tools to derive global estimates from national, aggregated data.

A stepwise development and implementation approach was chosen. Stage I and III has been finished. In 2007 the Baltic survey BIAS began using FishFrame.

5.1 Status

5.1.1 Software

Last upgrade (versions 4.3) was made prior to WGBIFS and PGHERS 2007. Version 4.3 is regarded as stable in production and has been well tested.

Main features in a distant future version 5.0 would be:

- Stage II. Full implementation of a feature rich user interface for national raising from stage I data to stage III data. This includes dynamic user specified options for combination of catches, selection of homogeneous regions, calculation of mean cross section σ, estimation of un-sampled strata, stratification etc. (This has been preliminary planned/specified

during a workshop in Copenhagen 2006, see PGHERS 2007 report for details), but an extra meeting/correspondence would be needed so that all users can work with the requirement specifications before the development process begin.

- Multiple standard outputs to fit the needs for working group reporting.
- Pivot reports on stage I data.
- Logging of all data processing.
- Delete data module.
- Download data module.
- Complete browser independence (missing only on pivot reports).
- Outlier analysis of CA data.
- Possibility to upload stage III data in CSV-files.
- Data status reports (all stages).
- Addition of new dimensions in pivot tables in real time.
- Specific security role to process acoustic data.
- Reorganize the reports/analysis/output in a user friendly wizard. The menu has grown too large with content, making it uneasy to use.

5.1.2 Exchange format

The exchange format was discussed during and after the WGBIFS 2007 meeting. The requested additions and changes were summarized in a mail, that all members had two weeks to comment. Since only positive feedback was given, it was implemented and released 16 April.

Following changes to the format are suggested in order to harmonize the acoustic format with the commercial fisheries format and to make the format applicable to multiple surveys (e.g. May/June + October + .HERAS).

- Add a SL (SpecesList) record. This will normalize the format and make it in line with the commercial fisheries format.
- Add "Survey" and "Country" fields to the AB and SD records.
- Add a "Data source" field to the AB and SD records, to distinguish between uploaded and calculated (in stage II) data.

5.1.3 Data

Stage 3

Rainer Oberst has migrated and released all BAD1 data as part of the EU-project "Balance".

The actual status can be seen in table 5.1 and 5.2.

Table.5.1. Herring data status on stage 3. √ = released, (√) = uploaded but not released, - = missing, NP = not participating.

.- Herring -.	EST	FIN	GFR	LAT	LIT	POL	RUS	SWE
1991	NP	NP	√	√	NP	NP		NP
1992	NP	NP	√	?	NP	NP	√	√
1993	NP	NP	√	√	NP	NP		NP
1994	NP	NP	√	?	NP	√	√	√
1995	NP	NP	√	?	NP	√	√	NP
1996	NP	NP	√	?	NP	√	√	√
1997	NP	NP	√	?	NP	√	√	NP
1998	NP	NP	√	?	NP	√	√	√
1999	√	√	√	?	NP	√	√	√
2000	√	√	√	?	NP	√	√	√
2001	√	NP	√	?	NP	√	√	√
2002	√	NP	√	√	NP	√	√	√
2003	√	NP	√	?	NP	√	√	√
2004	√	NP	√	?	NP	√	√	√
2005	√	NP	√	?	√	√	√	√
2006	√	√	√	?	-	√	√	√

Table.5.2. Sprat data status on stage 3. √ = released, (√) = uploaded but not released, - = missing, NP = not participating.

.- Sprat -.	EST	FIN	GFR	LAT	LIT	POL	RUS	SWE
1991	NP	NP	√	√	NP	NP		NP
1992	NP	NP	√	?	NP	NP	√	√
1993	NP	NP	√	√	NP	NP		NP
1994	NP	NP	√	?	NP	√	√	√
1995	NP	NP	√	?	NP	√	√	NP
1996	NP	NP	√	?	NP	√	√	√
1997	NP	NP	√	?	NP	√	√	NP
1998	NP	NP	√	?	NP	√	√	√
1999	√	√	√	?	NP	√	√	√
2000	√	√	√	?	NP	√	√	√
2001	√	NP	√	?	NP	√	√	√
2002	√	NP	√	√	NP	√	√	√
2003	√	NP	√	?	NP	√	√	√
2004	√	NP	√	?	NP	√	√	√
2005	√	NP	√	?	√	√	√	√
2006	√	√	√	?	-	√	√	√

Stage 1 data:

The stage 1 data from 1991–2005 actually present in FishFrame was migrated from the old BADII system. The data quality was not satisfactory, especially in fields like date and position. This was handled whenever possible, but some data could not be

migrated. It is therefore recommended to check the data thoroughly or preferably to re-upload them country by country.

Status of the data upload of stage 1 data is given in Table 5.3.

WGBIFS recommends that all missing data from the BIAS 1991–2007 should be loaded in FishFrame before the end of 2008.

Poland has re-uploaded and released all data from 1995–2005 as part of the EU-project "Balance".

Table.5.3. Survey data status on stage 1. √ = released, (√) = uploaded but not released, - = missing, + = data under uploading process.

Country	EST		FIN		GFR		LAT		POL		SWE	
Year \ File type	**AF**	**AA**	**AF**	**AA**	**AF**	**AA**	**AF**	**AA**	**AF**	**AA**	**AF**	**AA**
1986	NP	NP	NP	NP	?	?	?	?	NP	NP	(√)	(√)
1987	NP	NP	NP	NP	?	?	?	?	NP	NP	(√)	+
1988	NP	NP	NP	NP	?	?	?	?	NP	NP	(√)	(√)
1989	NP	NP	NP	NP	?	?	?	?	NP	NP	(√)	+
1990	NP	NP	NP	NP	?	?	?	?	NP	NP	(√)	(√)
1991	NP	NP	NP	NP	?	(√)	?	?	NP	NP	(√)	(√)
1992	NP	NP	NP	NP	?	(√)	?	?	NP	NP	(√)	(√)
1993	NP	NP	NP	NP	?	(√)	?	?	NP	NP	NP	NP
1994	NP	NP	NP	NP	(√)	(√)	?	?	-	-	(√)	+
1995	NP	NP	NP	NP	(√)	(√)	?	?	√	√	NP	NP
1996	NP	NP	NP	NP	(√)	(√)	(√)	(√)	√	√	(√)	(√)
1997	NP	NP	NP	NP	(√)	(√)	(√)	(√)	√	√	NP	NP
1998	NP	NP	NP	NP	(√)	(√)	(√)	(√)	√	√	(√)	(√)
1999	-	-	-	-	(√)	(√)	(√)	(√)	√	√	(√)	(√)
2000	-	-	-	-	√	√	(√)	(√)	√	√	(√)	(√)
2001	-	-	NP	NP	?	(√)	(√)	(√)	√	√	(√)	(√)
2002	-	-	NP	NP	(√)	(√)	?	?	√	√	+	(√)
2003	-	-	NP	NP	?	(√)	(√)	(√)	√	√	(√)	(√)
2004	-	-	NP	NP	?	(√)	(√)	?	√	√	(√)	(√)
2005	-	-	NP	NP	?	(√)	(√)	(√)	√	√	+	(√)
2006	(√)	(√)	(√)	(√)	?	(√)	√	√	+	+	+	+
2007	-	-	-	-	?	?	(√)	(√)	+	+	+	+

5.2 Conclusion and planning

5.2.1 Funding

So far DTU-Aqua (Denmark) has financed the development costs with some support from the EU. Further development must be based on either EU funding or funding by shared costs by the user countries.

5.2.2 Steering & ownership

FishFrame is *not* a DIFRES system. It is open source with shared ownership by the fisheries science community. More information **about ownership and steering** is found in Degel and Jansen (2006).

5.2.3 FishFrame workshops

If proper funding for a next version is found, then one or more workshops should be held in order to give the users hands-on experience with data processing (stage II) and reporting/analysis.

5.3 References

Degel, H and Jansen, T, (2006). FishFrame - Fisheries and stock assessment data framework. CM 2006/M:02.

6 Plan and decide on acoustic surveys and experiments to be conducted in 2008 and 2009

6.1 Planned acoustic survey activities

All the Baltic Sea countries intend to take part in acoustic surveys and experiments in 2008. The list of participating research vessels and periods are given in the following table:

Vessel	Country	Area of investigation (ICES Subdivisions)	(Preliminary) period of investigations	Duration (days)
Walther Herwig III	Germany	24, 25, 26 (part), 27 (part)	05.-26.5.	22
Baltica	Latvia, Poland	26 (part), 28	14.-25.05.	12
Darius	Lithuania	26 (Lithuanian EEZ)	May	2
Atlantniro/ Atlantida	Russia	26	June - July	12
Baltica	Poland	24(N), 25, 26	14.09. – 1.10.	18
Argos	Sweden, Finland	30	21.09.-03.10.	13
Argos	Sweden	25(N), 27, 28 (W), 29 (W)	12.-31.10.	20
Solea	Germany, Denmark	21, 22, 23, 24	02.-21.10.	19
Baltica	Latvia, Poland	26(N), 28	08.–18.10.	11
Baltica	Estonia, Finland, Poland	28(part), 29 (N), 32(W)	19.-30.10.	12
Atlantniro/ Atlantida	Russia	26	11.-23.10.	12
Darius	Lithuania	26 (Lithuanian EEZ)	October	2
Charter	Latvia, Estonia	28 (Gulf of Riga)	25.07.-05.08.	10

The preliminary plan for acoustic surveys and experiments in 2009 for majority of institutes is presented in the text table below. However, the final outline of plans will be available after verification of budgets.

Vessel	Country	Area of investigation (ICES Subdivisions)	(Preliminary) period of investigations	Duration (days)
Baltica	Latvia/Poland	26 (W), 28	May	12
Walther Herwig III	Germany	24, 25, 26 (part), 27 (part)	May	22
Darius	Lithuania	26 (Lithuanian EEZ)	May	2
Atlantida/ Atlantniro	Russia	26	May	10
Baltica	Poland	24 (part), 25, 26	September-October	18
Baltica	Latvia, Estonia, Finland, Poland	SD26 (W), 28, 29 (N), 32 (W)	October, November	22
Argos	Sweden	25(N), 27, 28 (W), 29 (W)	September-October	20
Argos	Sweden, Finland	30	September-October	13
Solea	Germany/Denmark	21, 22, 23, 24	October	22
Darius	Lithuania	26 (Lithuanian EEZ)	October	2
Atlantida/ Atlantniro	Russia	26	October	12
Charter	Latvia, Estonia	28 (Gulf of Riga)	July	10

6.2 An extended acoustic survey in the Gulf of Bothnia

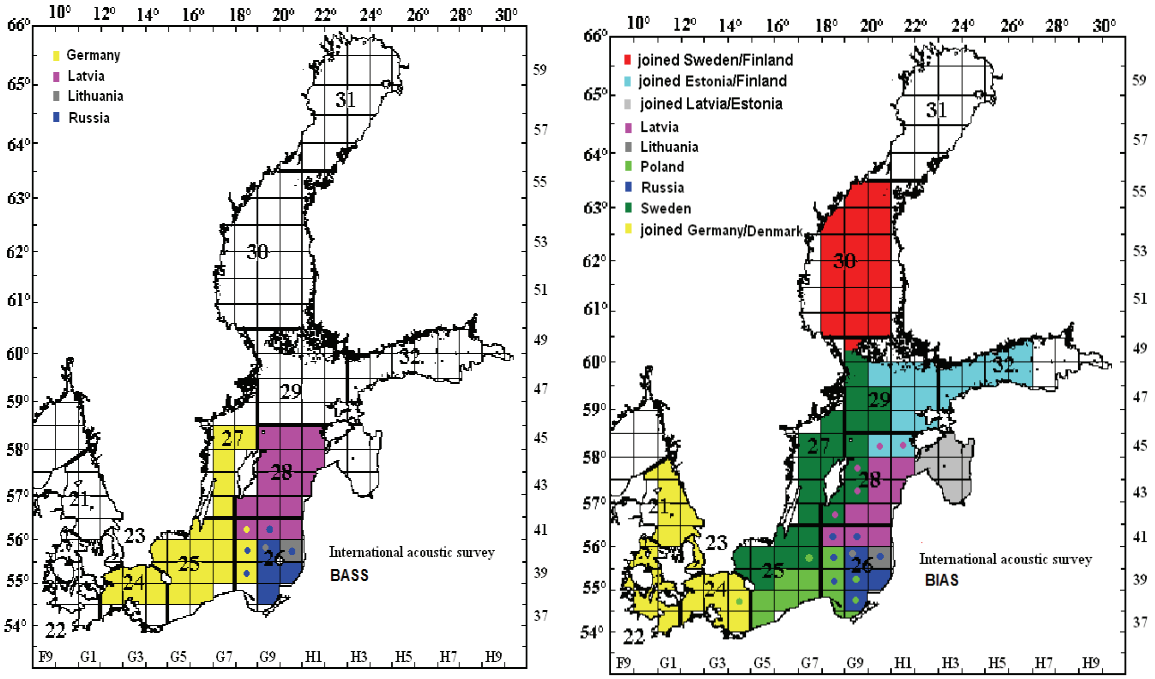
In 2006, the WGBFAS pointed out the need for an acoustic survey in SD 30 and 31. According to this recommendation Sweden prolonged their acoustic survey up to the SD 30 in the autumn 2007. Furthermore, Sweden and Finland are planning a joint acoustic survey in SD 30 to be started in the autumn of 2008. The objective of this new acoustic survey is to obtain fishery independent data and spatial distribution on the herring population in the Gulf of Bothnia. An additional aim is also to get fishery independent data and spatial distribution on the sprat population, which seems to expand into the Gulf of Bothnia the last years.

6.3 New design of acoustic surveys (proposed in 2005)

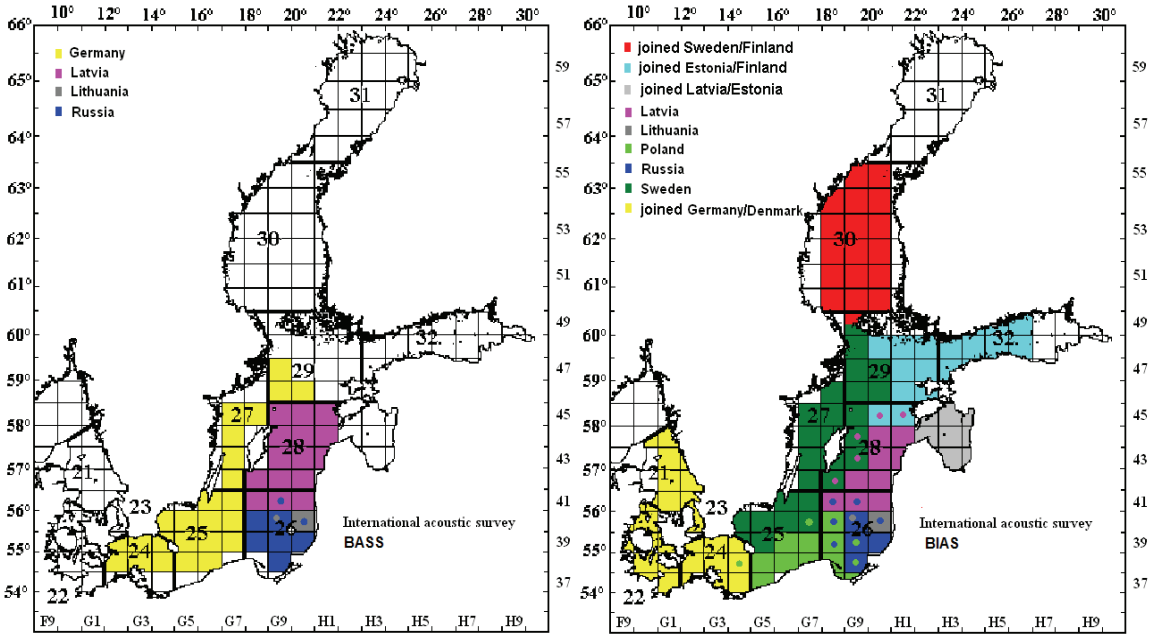
During the WGBIFS-Meeting in 2005, the working group discussed and agreed a new surveys design of acoustic surveys (see WGBIFS report 2005). The basic idea was that each ICES-Rectangle is assigned to one nation. That means that the mandatory nation will carry out about 60 miles of acoustic measurements covering the complete rectangle and at least 2 control hauls. The data of the nation, which is responsible for the rectangle, are used for estimating the stock indices. However, it is allowed for all nations to cover also other areas (rectangles, part of rectangles).

As many countries are performing joint acoustic surveys and the data is presented to the WGBIFS on survey basis, therefore the ICES-Rectangles are assigned on national/joint survey basis for 2008 and 2009.

The planned coverage of the Baltic Sea and the assignment of the national/joint acoustic surveys to the rectangles in 2008 are presented in Figure 6.3.1 and 6.3.2. The planned coverage of the Baltic Sea and the assignment of national/joint surveys to the rectangles during the acoustic surveys in 2009 are presented in Figure 6.3.3 and 6.3.4.



Figures 6.3.1.-6.3.2. The planned coverage of the Baltic Sea and the assignment of the national/joint acoustic surveys to the rectangles during the May and the October surveys in 2008 (from left to right). Base colours of rectangles indicate the country or joint survey, which is responsible for this ICES-rectangle. Coloured dots indicate overlapping coverage by other countries (sometime only parts of rectangle are covered).



Figures 6.3.3.-6.3.4. The proposed preliminary partitioning (assignment of the national/joint surveys to rectangles) for the May and the October surveys in 2009 (from left to right). Base colours of rectangles indicate the country or joint survey, which is responsible for this ICES-rectangle. Coloured dots indicate overlapping coverage by other countries (sometime only parts of rectangle are covered).

Furthermore, the ICES-rectangles presented in the table below have to be additionally covered by more than one nation for inter-calibration purposes.

Following table defines these rectangles for the May survey in 2008 and 2009:

Country	Rectangle	Mandatory/optional
Russia	39G8, 40G8, 41G9	mandatory
Russia	40H0, 41G8	optional

Following table defines these rectangles for the October survey in 2008 and 2009:

Country	Rectangle	Mandatory/optional
Russia	39G8, 40G8, 41G9	mandatory
Russia	40H0, 41G8	optional
Latvia	45G9	optional

The main results of both acoustic surveys in May/June and October 2008 should be summarized and reported in standard report format (ICES CM 2002/G:05 Ref. H, Annex 5) and in BAD1 format to the acoustic surveys co-ordinator **(Niklas Larson, niklas.larson@fiskeriverket.se)** and the BAD1 manager **(Eberhard Götze, eberhard.goetze@ifh.bfa-fisch.de)** not later than 1st of March 2009 (one month before the ICES WGBIFS meeting). These results are intended for the information of the ICES Assessment Working Groups.

7 On the coordinated bottom trawl survey in 2007 and 2008

7.1 Ancylus survey in the Kattegat

No presentation of the result from the 2007 Ancylus survey was available. Sweden is requested to deliver a summary of the survey for next years WGBIFS report.

It is recommended that the data collected during the survey are uploaded to DATRAS for documentation, data check and further analysis.

Furthermore, it is recommended that all fish species are worked up following the same procedure as established for the BITS.

It is recommended that some work is done intercessional looking into the possibility to coordinate the Ancylus and the Havfisken survey to such degree that a combined index can be developed.

7.2 Havfisken survey in the Kattegat (KASU)

4th quarter 2007

All planned 25 hauls were carried out successfully in Kattegat from 15 October to 2 November 2007. No cases of gear damage were experienced. CTD stations were made in connection with all hauls and no stations had oxygen concentrations below 0.5 ml/l. Hence, no assumed zero catches.

The results were submitted to ICES for upload in DATRAS. A complete data serial from 1994–2007 is available and submitted to ICES for upload in DATRAS.

The WG considers the quality of the data sufficient and recommends that data can be used for calculating of tuning index for cod.

1st quarter 2008

All planed 25 hauls were carried out successfully in Kattegat from 26 February to 26 March 2008. No cases of gear damage were experienced. CTD stations were made in

connection with all hauls and no stations had oxygen concentrations below 0.5 ml/l. Hence, no assumed zero catches.

The results will be submitted to ICES for upload in DATRAS as soon as the otoliths are age determined. A complete data serial from 1995–2007 is available and submitted to ICES for upload in DATRAS.

Data from both series are used for tuning and support of the assessments of the Kattegat cod stock and the Kattegat sole stock.

The WG considers the quality of the data sufficient and recommends that data can be used for calculating of tuning index for cod.

7.3 Sole survey in the Kattegat

No presentation of the result from the 2007 survey was available. Denmark is requested to deliver a summary of the survey for next years WGBIFS report.

It is recommended that the data collected during the survey are uploaded to DATRAS for documentation, data check and further analysis.

7.4 BITS

4th quarter 2007

A total of 233 hauls were planned for this survey. 24 hauls were replaced. 14 hauls were invalid. 29 hauls were assumed as zero catch. It can be assumed that this survey was performed only with minor deviations which do not affect the coverage of the survey and WGBFAS can therefore recommend that the data can be used as basis for calculation of indices. All collected data is already submitted to DATRAS database. There were 3 cases of trawl damages. Most countries performed acoustic logging during survey.

The WG considers the quality of the data sufficient and recommends that data can be used for calculating of tuning index for cod.

1st quarter 2008

Total 277 hauls were planned for this survey. Total 21 hauls were replaced. 17 hauls were invalid and 23 hauls were assumed as zero catches. It can be assumed that this survey was performed only with minor deviations which do not affect the coverage of the survey and WGBFAS can therefore recommend that the data can be used as basis for calculation of indices. Several trawl damage events were encountered. Most countries performed acoustic logging during survey.

Standard reports giving overviews of the result of 1st and 4th quarter surveys from each country can be found in Annex 8. More detailed descriptions of most of the individual surveys can be found in Annex 5 (or Annex 9 if the report is presented as a working document).

The WG considers the quality of the data sufficient and recommends that data can be used for calculating of tuning index for cod.

8 Plan and decide on demersal trawls surveys and experiments to be conducted in autumn 2008 and spring 2009

The procedure which is used for allocating stations to the ICES Subdivisions and depth layers is described in Annex 3 "Method used for planning the Baltic international trawl survey" of the WGBIFS report in 2004. The DATRAS Database (version from March 2008) was used to estimate the running means of distribution pattern of both cod stocks by depth layer and the ICES Subdivision. The running mean of the BITS indices of age group 1+ of cod from 2003–2007 in spring was used based on the current used version of conversion factors which are stored in the DATRAS system.

The most institutes plan the same numbers of hauls during BITS surveys in autumn 2007 and spring 2008 as in the years before. The small variations did not lead to a significant decrease of the total number of stations by surveys.

The total number of available stations (Table 8.1) was used in the combination with the results of relative distribution of stations by the ICES Subdivision and depth layer (Table 8.2 and 8.3) to allocate the number of total planned stations by the ICES Subdivision and depth layer for the different surveys. Tables 8.4 and 8.5 present the allocated hauls by the ICES Subdivision and the depth layer for the autumn survey in 2008. Furthermore, the number of hauls to be carried out by countries in the different Subdivisions is given. Tables 8.6 and 8.7 show the corresponding data for the survey in the spring 2009.

The allocation of station by country and the ICES Subdivision is preliminary. It is possible that the number of stations can be slightly changed to minimize the total distance between the assigned hauls by country. Furthermore, it is required that the coast line (at least 12 nm) will be covered by the nation of the territorial waters to reduce problems with national permissions.

Russia will only cover the Russian zone during the autumn survey 2008.

Table 8.1. Total numbers of the stations which are planned by country during BITS in autumn 2008 and spring 2009.

Country	Vessel	Number of planned stations in autumn 2008	Number of planned stations in spring 2009
Germany	Solea	60	57
Denmark	Havfisken	23	23
	Total 22 + 24	**83**	**80**
Denmark	Dana	50	50
Estonia	Commercial vessel	10	
Finland			
Latvia	Chartered vessel	25	25
Lithuania	Darius	8	8
Poland	Baltica	27	34
Russia	Atlantniro	15	33
Sweden	Argos	30	50
	Total 25 - 28	**248**	**280**

Table 8.2. Basic data for allocating the hauls of the survey by the ICES Subdivision.

ICES	Total area of the depth layer 10-120 m	Proportion of the SD (weight=0.6)	Running mean of the CPUE value of age groups 1+ (2003 – 2007)	Proportion of the index values (weight=0.4)	Proportion of the stations	Special decisions (additional stations)
Subdiv.	**[nm²]**	**[%]**		**[%]**	**[%]**	
22	3673	39	331	40	40	
23	0	0	0	0	0	3
24	5724	61	490	60	60	
Total	9397	100	822	100	100	
25	13762	43	519	63	51	
26	9879	31	220	27	29	
27	0	0	0	0	0	10
28	8516	26	89	11	20	
Total	32156	100	827	100	100	

Table 8.3. Basic data for allocating the hauls according to the depth layer for the survey by the ICES Subdivision.

ICES Subdiv.	Depth layer	Total area of the depth layer	Proportion of the depth layer (0.6)	Running mean of the CPUE value of age group 1+ (2003 - 2007)	Proportion of the depth layer (0.4)	Proportion of the depth layer
	[m]	**[nm²]**	**[%]**		**[%]**	**[%]**
24	10 - 39	4174	73	308	12	49
	40 – 59	1550	27	973	39	32
	60 – 79	29	0.50	12ß6	49	20
	Total	5724	100	2487	100	100
25	10 - 39	4532	37	111	5	24
	40 - 59	3254	26	896	42	33
	60 - 79	3037	25	856	41	31
	80 -	1461	12	247	12	12
	Total	12284	100	2110	100	100
26	10 - 39	2379	23	53	5	16
	40 - 59	1519	15	336	29	21
	60 - 79	1911	19	440	38	26
	80 - 100	2872	28	193	17	24
	100 - 120	1504	15	136	12	14
	Total	10185	101	1158	100	100
27	10 - 39	1642	31			18
	40 - 59	1101	21	12	12	17
	60 - 79	996	19	73	71	40
	80 -	1596	30	17	17	25
	Total	5335	100	100	199	100
28	10 - 39	2589	39	1	0	23
	40 - 59	1598	24	24	4	16
	60 - 79	1101	16	207	45	28
	80 - 100	1389	21	232	50	32
	Total	6677	100	463	100	100

Table 8.4. Allocation of the planned stations by country and the ICES Subdivision in autumn 2008.

		ICES Subdivision						
Country	**Total**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Denmark	**73**	19	4		40	10		
Estonia	**10**							10
Finland	**0**							
Germany	**60**	13		47				
Latvia	**25**					12		23
Lithuania	**8**					8		
Poland	**27**				27			
Russia	**15**					15		
Sweden	**30**				12		10	8
Total	**248**	32	4	47	79	45	10	31

Table 8.5. Allocation of the planned stations by ICES Subdivision and depth layer in autumn 2008.

ICES Subdivision	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Depth layer [m]							
10 – 39	32	3	22	19	7	3	7
40 – 59			15	26	9	2	5
60 – 79			9	25	12	2	9
80 – 100				9	11	3	10
100 – 120					6		
Total	32	3	46	79	45	10	31

Table 8.6. Allocation of the planned stations by country and ICES Subdivision in spring 2009.

		ICES Subdivision						
Country	**Total**	**22**	**23**	**24**	**25**	**26**	**27**	**28**
Denmark	**73**	20	3		50			
Estonia	**0**							
Finland	**0**							
Germany	**57**	10		47				
Latvia	**25**					12		13
Lithuania	**8**					8		
Poland	**34**				24	10		
Russia	**33**				8	25		
Sweden	**50**				15		10	25
Total	**280**	30	3	47	96	55	10	38

Table 8.7. Allocation of the planned stations by ICES Subdivision and depth layer in spring 2009.

ICES Subdivision	22	23	24	25	26	27	28
Depth layer [m]							
10 – 39	30	3	22	24	9	3	9
40 – 59			15	32	11	2	6
60 – 79			9	30	15	2	11
80 – 100				11	13	3	12
100 – 120					7		
Total	30	3	46	97	55	10	38

9 Update and correct the tow database

9.1 Reworking of the Tow Database

Feedback of the last surveys have shown that the structure of the Tow Database use suitable for the routine use now. Therefore, changes of the structure were not proposed and discussed. The current used structure was described in the report of the WG BIFS meeting in 2005 and in the BITS manual of this report.

The feedbacks of the surveys in November 2007 and partly of the survey in spring 2008 were used to improve the quality of the Tow Database. Some stations were deleted (stones, wrecks, area with munitions) or were corrected dependent on the information of the different countries. More than 90 % of the stations which are stored in the Tow Database were already successfully used at least one time. The experience shows that it is possible that the gear is destroyed at stations which were already successfully used during the previous surveys. Those hauls were further used in the Tow Database. These data are marked and if the similar problems were found during the next use the station was deleted.

Final version of the Tow Database was not available during the meeting because the feedback of the BITS in spring 2007 was not available before the meeting started. The missing feedback will be used immediately after submission by the countries. Then the version TD_2008V1.XLS will be made available for all countries.

9.2 Feedback of the BITS

Structure of feedback of the BITS was agreed two year ago. This structure should be used for reporting the information from the realized hauls. The aim of the structure is to make it easy as possible to rework the Tow Database. The experiences of the last years made it necessary to explain some codes more detailed.

The following information of all realized stations of BITS should be submitted to Germany:

- New version of haul number for the Tow Database
- ICES Subdivision
- Start position (latitude, longitude)
- Mean depth
- Depth range
- TV3 version: 1 – TV3#520, 2 – TV3#930
- Used ground rope: 1 – standard ground rope, 2 – rock hopper ground rope
- Code of the haul
- Reason for deleting the haul

Set of codes (see table below) for characterizing the different type of realization of hauls was defined.

Code		Case
A		The position and the mean depth are suitable. Small changes of the positions are possible due to weather condition, gillnets. Data of the Tow database must not be changed in these cases.
B	1	The position is suitable, depth must be corrected. Small differences of the water depth which not significantly influence the assignment of the haul to the depth layer and which probably are determined by the variability of the surface layer must not be marked by this code.
B	2	Depth is ok, position must be corrected (reason). This code must be used when the position must be permanent changed due to reasons which will not be changed in the future
B	3	The required depth is not stable, new position is proposed with flat bottom
C		The position is not suitable and it should be deleted (reason)
D		New haul for the database

9.2.1 Recommendations:

It was agreed that:

The feedback from the realized surveys should be submitted to Germany using the proposed standard format not later than **20 December** (autumn survey) **and immediately after the spring survey.**

- It is not allowed to use the rock hopper ground rope in the following areas:
  - southern part of ICES Subdivision 24
  - ICES Subdivision 25
  - southwestern part of ICES Subdivision 26
- The standard ground rope must be used when the station was successfully carried out during earlier surveys with this gear (see the columns TV3 and ground rope in the TD).
- New haul positions should be submitted to Germany as soon as possible. Especially, hauls in the "white areas" are necessary to cover the total distribution area of the target species. It was proposed that time should be used during surveys to allocate new haul positions in the "white areas".

10 Review and update THE BALTIC INTERNATIONAL TRAWL SURVEY MANUAL (BITS)

Review of the text of the BITS manual has resulted in the following changes and supplements:

a) "SAMPLING OF TRAWL CATCHES" – "Age, sex, individual mass (weight) and maturity sampling procedure" – following procedure was accepted by the WGBIFS: If one country realises less than 5% of the total number of hauls allocated in an ICES Subdivision then the country is not compelled to collect the fish age samples;

b) "EXCHANGE SPECIFICATIONS FOR THE BALTIC INTERNATIONAL TRAWL SURVEY DATA" – "Record type HH" – in order to correctly record haul duration for the planed catch station, but not realised due to the oxygen deficit on the bottom and used codes in the record type HH

following changes were made: 15 to 90 minutes if the validity code is "V", 0 minutes if the haul validity is "N", 0 to 90 minutes if haul validity is "I";

c) "EXCHANGE SPECIFICATIONS FOR THE BALTIC INTERNATIONAL TRAWL SURVEY DATA" – "Record type HL" – in order to obtain very needed clearly description of the term "SubFactor" (raising factor?) chairman of the WGBIFS should contact expert from the Data Centre in the ICES Secretariat;

d) "EXCHANGE SPECIFICATIONS FOR THE BALTIC INTERNATIONAL TRAWL SURVEY DATA" – "Record type CA" – in order to record fish maturity stage according to recently adopted 6-stage fish maturity scale (decided on the ICES Planning Group on Commercial Catches, Discards and Biological Sampling [PGCCDBS], meeting in March 2008 in Nicosia/Cyprus) information about abnormal fish gonads development (e.g. due to disease, atresia or intersexes) should be recorded when fish are biologically analysed;

e) "Annex 6" - maturity key was supplemented with the key 6 – abnormal (see an explanation in point above);

f) "Annex 12" - despite the fact that the DATRAS Website recommends applying the TSN species code 631023 for *Lumpenus lampretaeformis*, which at present is accepted as the only valid one, it is suggested that the DATRAS screening programme recognizes both 171588 and 631023 as valid TSN codes for the species.

11 Review and update THE BALTIC INTERNATIONAL ACOUSTIC SURVEY MANUAL (BIAS)

Review of the text of the BIAS manual has resulted in following changes and recommended supplements:

a) "ACOUSTIC MEASUREMENTS" – "Equipment" – due to the fact that new echo-sounders are applied to acoustic surveys the list of used standard equipment was updated,

b) "ACOUSTIC MEASUREMENTS" – "Instrument settings" – following settings was changed:

- pulse rate : to high ping rate, and
- pulse length: to 1 msec.

c) "ACOUSTIC MEASUREMENTS" – "Calibration" – due to recommended changes in the instruments settings the high ping rate should be applied also during calibration of the echo-sounder process.

d) "DATA EXCHANGE AND DATABASE" – "Exchange of survey results" – actual e-mail address (Niklas.Larson@fiskeriverket.se) of the Baltic Acoustic Surveys coordinator was added; submitted data should be in the BAD 1 format,

e) "BAD 1" – "Tables 6.1 and 6.2" – the inner structure of tables was slightly changed due to the fact that the data about percentage of cod in control-hauls should be added.

12 Vertical distribution of cod

The WGBIFS meeting 2007 recommended (ICES 2007) that certain studies should be made during the BITS cruises in 4th quarter 2007 and 1st quarter 2008. Results from these studies have been delivered from the participating countries.

12.1 Results

12.1.1 Denmark

On 14 stations Dana experienced oxygen contents below 0.5 ml/l. According to the guidelines agreed during the WGBIFS meeting in 2007, Dana should perform special experiment on these stations in order to investigate the vertical distribution of cod under such hydrographical conditions. Therefore, acoustic integration was made following the haul track which was supposed to be fished with the bottom trawl under normal oxygen situation. Based on the distribution of the biomass in the water column, a trawl haul was made in the depth where the most biomass was detected using Expo midwater trawl. The highest concentration was in all cases just above the thermo cline. Multi-frequency (3 freq.) integration was used with a ping rate of one ping per second. The data were after the cruise handed over to the Swedish institute for analyses for distribution of bigger cod (>34 cm). Unfortunately, it was discovered that it was not possible to use the "tracking method" because the ping rate applied was to low. Instead the data will be analysed using the more standard acoustic method comparing the result of the trawling with the result of the integration in order to estimate the density of cod. In general rather few cod were observed, which seems to be in contrast to the observations done by Sweden in the same area.

12.1.2 Russia

Acoustic measurements were carried out continuously during the total time of BITS. The settings of the acoustic equipment required for the resolution of cod were used according to the recommendations of WGBIFS 2007. To estimate the fish species and length composition in pelagic layers, located above the areas with oxygen depletion near the bottom, the pelagic trawl was used. A fish species percentage obtained from trawling was used for cod density estimation. The water sites for micro survey (the area 2x0, 25 of ICES rectangles), located above benthonic area with deficiency of oxygen, have been defined on base of the oxygen distribution map in benthonic area.

The oxygen content in benthonic area at the depth of 60–80m has been less than 1, 5 ml/l. The water area selected for experimental survey and scheme of cruise track with position of trawling is shown on figure 12.1.2.1. Separate circles designate positions of trawling of 1 and 2 stages of the experiment.

For the second stage of experimental jobs, the range located along a site of depths 60–80m with capture of a boundary layer where the contents of oxygen in benthonic area has been made less than 1, 5 ml/l has been chosen. The survey transects have been developed proceeding from a condition of a "normal" direction of transects in relation to lines with same depth. All pelagic trawling (No. 26–29) of experimental survey, were carried out on distance 6m from bottom rope of a trawl to the bottom. Cod was present in all hauls and constitutes 6–24 % (by weight) of the total catch. No catch was obtained on standard bottom trawl No. 31 (close to trawl No. 29).

On Figure 12.1.2.1 all experimental trawling and area of experimental cod survey are shown. In the left figure distribution SA on area echo survey, in a benthonic layer of 0.1–5.5 m where deficiency of oxygen has

been found, is shown. Full absence echo records (value of SA less than 1) are well visible. In right figure, distribution SA in pelagic layer (from 55m up to 5,5m from a bottom) is shown. Averages SA value of between 20-160m²/nm² is measured for the benthos in the pelagic layer. The experimental calculation of a cod biomass on micro survey, as percentage share of catches, are shown in table 12.1.2.1 (in view of features of TS - cod).

The echo-counting method did not used, because only demo version of Echo-View (echo-trace module) is available at the institute.

Table 12.1.2.1. RV "Atlantniro", survey statistics cod micro survey, 23 - 27.10.2007

No	Area	ICES	SA (m^2/nm^2)		Quantity, mln			Biomass, tonn		
trawl	nm^2	Rect.	Cod	Her+Spr	N cod	N her	N spr	W cod	W her	W spr
26,27,28, 29	376,0	40G9	4,996	73,1	0,349	64,3	7,9	381,0	3867,1	95,6

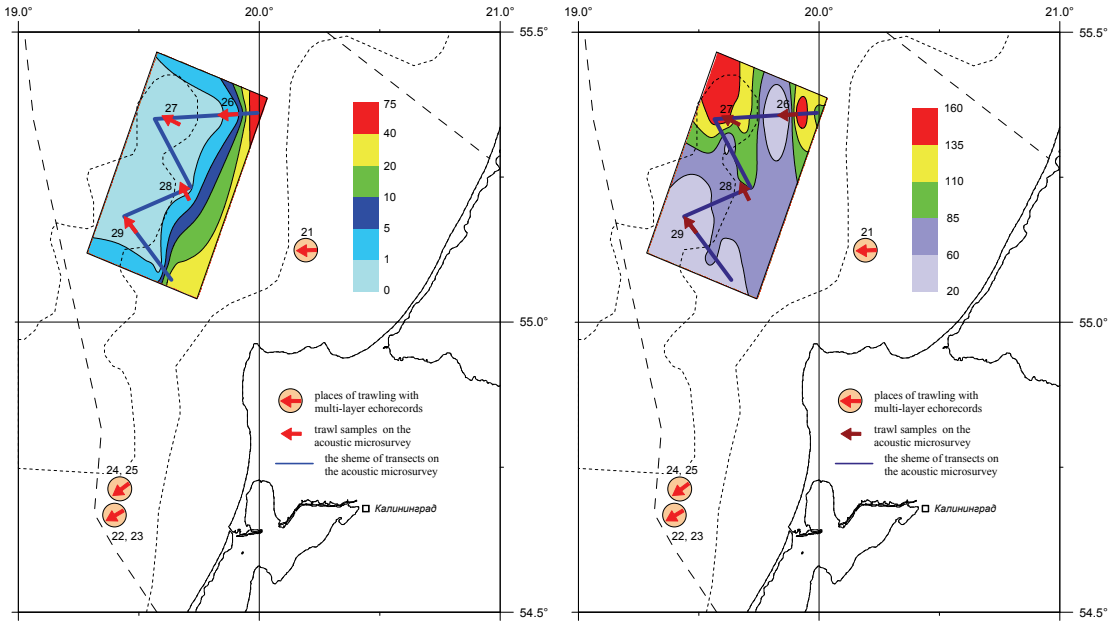


Figure 12.1.2.1. The map of SA-values distribution in low-oxygen experiment on the Russian area of international BITS-survey with acoustic attending. At the left map near bottom layer: 0.1–5.5m, at the right map, pelagic layer from 55m to -5.5m from bottom (RV "Atlantniro", 23–27.10.2007).

12.1.3 Sweden

A working paper describing a study using traditional methods to assess cod density above oxygen deficient bottoms was presented during the meeting (Håkansson *et al.*, 2008). The CPUE obtained with the pelagic trawl in midwater over bottom water with oxygen deficiency is of the same order of size as the CPUE reported in the cruise report for RV Argos when using the TV3L when the oxygen conditions are good The conclusion from this paper is that cod density must be assessed using other methods than bottom trawling when oxygen conditions in the bottom water is poor.

In addition to this, preliminary results from echo tracking and fish counting in the same area as in the above mentioned working paper were presented. Acoustic data from areas with both high and low oxygen levels at the bottom was analysed with the

software Sonar 5. Acoustic data was filtered and tracks with a target strength higher than -37 dB was used. The data showed that cod was present above oxygen depleted zones and that the density of cod can be comparable to densities found where the oxygen situation is good all the way down to the bottom. Cod was also fund to "dive" into oxygen levels below 1 ml/l.

12.2 Conclusions and recommendations

The WGBIFS concludes that cod in the pelagic water above oxygen deficient bottom water cannot be neglected and that a measure of the abundance must be established. The following recommendations were adopted during the meeting:

a) In ICES Subdivision 25 the RV "Dana" should store acoustic data and make transects during daylight so that pelagic cod density above the area(s) where the bottom water is oxygen deficient can be assessed using the standard method described in the BIAS Manual (ICES. 2008) with the exception that the ping interval should be 0.3 s and the pulse duration 0.256 ms in order to make it possible to analyze the acoustic data using echo tracking. The size of the area is determined using oxygen sampling at bottom and 5 m above. Pelagic control hauls during daylight must be performed to obtain a species and length composition. The hauls should be made in the fish layer immediately above the oxygen deficient layer, no matter that the Sa-values may be higher in the water layers above. Only Sa-values from the water layer(s) fished should be used for the BIAS standard density estimation. Data for echo tracking can be recorded day and night and will be analyzed by Niklas Larson at the IMR, Lysekil. EK60 raw files, where data from the whole water column will be used in combination to oxygen data at each transect, are needed. The RV Dana study will be performed both in quarter 4, 2008 and quarter 1, 2009.

b) The RV "Argos" should in ICES Subdivisions 25 and 28 make acoustic transects during daylight and darkness in order to perform echo tracking. These transects should go along the gradient between good oxygen conditions at bottom and no oxygen at bottom. A ping interval of 0.3 s and a pulse duration of 0.256 ms should be used. If possible, a constant vessel speed is recommended during the acoustic measurements. Frequent oxygen observations along these transect should be done. No pelagic trawl samples are needed but TVL hauls in darkness at stations with good oxygen conditions should be done to give an idea of how much cod migrates vertically and how much stays at the bottom. This study will be performed both in quarter 4, 2008 and quarter 1, 2009. There is a need to reduce the number of planned TVL hauls in order to accomplish these tasks.

c) During the whole BITS cruises in quarter 4, 2008 and quarter 1, 2009, acoustic data using a ping interval of 0.3 s and a pulse duration of 0.256 ms should be collected by the RV "Argos", the RV "Dana" and the RV "Atlantniro". Other vessels may collect data according to their standard procedure.

12.3 References

Håkansson, Nils., Casini, M., Larson, N. and Rudolphi, A-C., 2008. Abundance of cod above oxygen deficient bottoms in the Baltic Sea. Working paper in Appendix 9.

ICES. 2007. Report of the Baltic International Fish Survey Working Group (WGBIFS). ICES CM 2007/LRC:06. REF. ACFM

ICES. 2008. Report of the Baltic International Fish Survey Working Group (WGBIFS). ICES CM 2008/LRC:08. Appendix 7 BIAS Manual in this report.

13 TOR i) Extension of DATRAS in time and space

It is known that many countries have data from the scientific bottom surveys which were precursor to what today is known as the internationally coordinated BITS. Until now, DATRAS contains all of those survey results back to 1991. In last years WG report it was requested that each laboratory should present an overview of existing precursors from before 1991 together with an estimate of the effort necessary for bringing the quality standard of the data to a level which allows that the data could be uploaded in DATRAS.

Most countries have applied to the request and the general response is that many data exists, but that the institutes have difficulties to allocate manpower to the task because of lack of personnel to perform the task.

The WG discussed the subject and recognize the usefulness for the assessment WG and others to have access to those data but at the same time understand the problems connected to making the data available through DATRAS. Therefore, the WG recommends that:

All countries which participate in the cooperation of the BITS are encouraged to bring national data before 1991 which can be regarded as precursors to the later BITS to such standard of quality that they can be uploaded to DATRAS.

From 2007 three new surveys are included in the coordination by the WGBIFS. This means that the WGBIFS now coordinate the bottom trawl surveys listed in the text table below.

Name of the survey	Participating countries
BITS 1st quarter	Sweden, Germany, Poland, Russia, Lithuania, Latvia, Denmark
BITS 4th quarter	Sweden, Germany, Poland, Russia, Lithuania, Latvia, Estonia, Denmark
KASU 1st quarter	Denmark
KASU 4th quarter	Denmark
Ancylus	Sweden
Kattegat sole survey	Denmark

In order for the WG to be able to conduct meaningful coordination and quality assurance of the surveys it is of vital importance that data are uploaded in DATRAS. Both BITS and both KASU surveys are already uploaded to DATRAS and it is recommended by the WG to make the necessary changes in DATRAS to allow the Ancylus and the Kattegat sole survey to be uploaded in DATRAS.

The WG recommends that the necessary changes in DATRAS are carried out in order to allow the Ancylus and the Kattegat sole survey data to be uploaded in DATRAS.

Only a closed list of species (excluding pelagic species and most non-commercial important species) are at present worked up during the Ancylus survey. Considering the growing importance of non-commercial important species as indicators for monitoring of environmental issues, it is recommended that all fish species are worked up during future Ancylus surveys. Furthermore, it is very convenient if

historical time series are available already at the time of initialization of new "assessment species". Survey data are important input to such time series.

The WG recommends that all fish species, which are caught, are worked up during future Ancylus surveys.

14 Evaluation of seasonal coverage of BITS (WGBFAS request)

WGBFAS requested to WGBIFS in 2008 to "Perform an evaluation of tuning data compilation for BITS autumn survey, taking into account possible cod distribution differences during spring and autumn surveys (e.g. pre-spawning season and feeding season in homothermic conditions). Is it appropriate for autumn surveys to apply the same calculation procedure for survey index estimation by ages and years as for spring survey?"

This problem was discussed during the meeting and it was concluded that the algorithm which is used for estimating stock indices of cod based on the trawl surveys uses the stratified random sampling techniques (Cochran 1972) where the depth layers are used as strata. This algorithm can be used for the data of the trawl surveys in spring and autumn. In both cases unbiased stock indices are estimated due to the used mathematical algorithms if the total distribution area of cod is covered by the survey independent whether the used stratification is optimal to get the lowest variance.

Another question is whether the used depth stratification of the Baltic Sea which is adapted to the cod density distribution of cod in spring is also the optimal depth stratification during the autumn surveys.

Studies were presented during the meeting related to the request (see WD Oeberst 2008, Annex 9). Catch per hour in units of TVL (CPUE) related to the maximum mean CPUE of all depth layers by ICES Subdivision, depth layer and age group were used for describing the mean distribution of cod by depth. Highest cod densities were observed in the depth layers 10 and 11 in ICES Subdivision 25 for age group 0 to 3 of BITS in quarter 4 and for age group 1 to 3 of BITS in quarter 1. Age groups 4 cod in autumn 2003 and 2004 and age group 4 and 5 cod in spring 2003 to 2006 were concentrated in the deepest layers. It can be concluded that the stock indices of the youngest cod (younger than 3 years in autumn and younger than 6 years in spring) are not biased if the shallowest areas are not be covered by the surveys. However, it is possible that in some years, higher fractions of older cod occurred in depth layer 8 which were not covered by the surveys. In these cases the stock index can be underestimated. The variability of the highest density between the depth layers 10 and 11 from year to year suggests that the used depth stratification of the Baltic Sea seems to be suitable for the BITS in spring and autumn. Similar distribution pattern were observed in ICES Subdivision 26

High fractions of cod of the most age groups were found in the depth layer 9 during the autumn surveys in ICES Subdivisions 28 (one exception in 2006). **This result suggests that it is necessary to extend the BITS into shallower waters in ICES Subdivision 28 during the autumn surveys.** The highest densities were observed in depth layer 10 in mean. Mean CPUE-values decreased with increasing depth during autumn surveys. In contrast to this the fraction of cod which stay in the depth layer 9 is low during the spring surveys. The older cod is more concentrated in the deeper waters and it might be in areas which are not regularly covered during the spring

survey. However, estimates from the depth layer 13 in 2003 and 2005 showed that cod were not captured within the depth layer 13.

It must be pointed out that the studies did not taken into account that cod probably stay in the pelagic water of the deepest parts due to low oxygen content close to the bottom.

CPUE-values per station of 5 cm length ranges (N5: 5–9 cm, N10: 10–14 cm) were used for additional studies. The distribution of CPUE of the same length range of chosen depth layers can be characterized by a variable fraction of zero catches and log-normally distributed CPUE-values which are larger than zero. Combination of a δ-function and log-normal distribution can be used for describing the distribution pattern for estimating the stock indices. This distribution is already taken into account by the bootstrap method.

Further analyses showed that the CPUE values of lager cod are correlated.

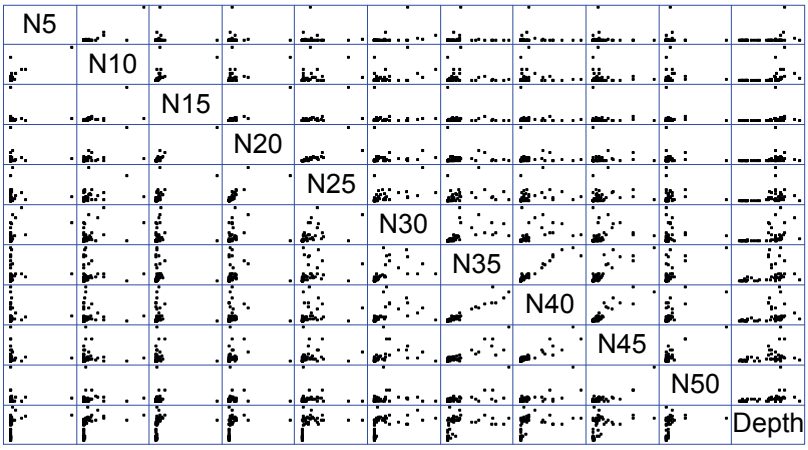


Figure 13.1: XY-plots of CPUE values of different length ranges and depth of cod captured in SD 24 in 2006, quarter 1.

The xy-plot of CPUE values of different length ranges of cod captured in SD 24 in 2006, quarter 1 together with depth illustrates that the CPUE-values of N35, N40 and N45 are highly correlated. The figure also illustrates that the highest CPUE-values of all length ranges were observed in the deeper water. Similar results were found for all ICES Subdivisions, quarters and years with variable relation between CPUE-values and depth like it is found based on the mean CPUE values of age groups. In some cases the CPUE-values smaller cod were also correlated.

The horizontal distribution of the different length ranges of cod is used to describe the distribution pattern in the total Baltic Sea. The twelve parts of Figure 1 (Annex 7) presents the depth distribution based on the depth of hauls of the quarter 1 survey in 2006. Iso-surface based on VG gridding was used for describing the horizontal distribution of depth based on the date of stations. Furthermore, the distribution of the temperature and salinity close to the bottom is presented based on the available data. Unfortunately, hydrographical data are available only for a low number of stations. In addition, the density distributions of cod with the length ranges N5, …, N45 are presented as Iso-surface plots.

15 Evaluation of tuning data available for the Kattegat cod assessment (WGBFAS request)

Perform an evaluation of tuning data available for the Kattegat cod assessment in order to explore the possibility of combining the indices that could potentially result in fewer, but more consistent time series. Taking into account possible spatial distribution differences between spawning (i.e. first quarter of the year) and non-spawning periods.

Two scientific surveys in Kattegat (beside the dedicated sole survey) are coordinated by WGBFAS: the "KASU survey" using The Danish RV "Havfisken" and the "Ancylus survey" using the Swedish RV "Ancylus". Even though the geographical coverage is complimentary, diverging in stratification, survey gear and seasonal coverage makes it difficult to compare the results of the two surveys. This means that change in survey procedure have to be put through for one of the surveys. This again means that one of the time series established has to be broken.

The working group postponed discussion of this issue because no national representatives for the Ancylus survey were participating in the meeting. It was decided that intercessional work should be carried out and that a working document clarifying the possibilities for a combined index should be elaborated for the WGBIFS next year.

16 Explore the possibilities to establish only one tuning index for the cod stock assessment in Western Baltic area (WGBFAS request)

Evaluate the BITS first quarter surveys in the western Baltic (RV "Havfisken" and RV "Solea") in order to explore the possibilities to establish only one tuning index for the cod stock assessment in this area.

Since 2001 an internationally coordinate trawl survey in SD 22–28 has been established. The participating countries use standard gears and the stations which are used during the surveys are allocated based on a standardized method for all vessels and areas. That means that the results of RV "Havfisken" which is responsible for the northern area of ICES Subdivision 22 due to national waters and the results of RV "Solea" which covers the southern part of ICES Subdivision 22 and total area of ICES Subdivision 24 present two parts of the coordinated surveys. The different signals which give the two parts of the coordinated surveys are result of the variable distribution pattern of cod in the both parts of the total distribution area of the western Baltic cod stocks.

Therefore, these data should be used together for estimating one stock index based on data of both vessels at least of the data which have been sampled since 2001. It does not make a sense to use data series which are based on less of a fourth of the total distribution area as stock index if it is known that the fraction of cod in this area is highly variable and data of the total area are available.

Significant amount of data are available from cruses prior to 2001 from RV "Solea" while only sporadic data are available from RV "Havfisken" before 2001. The data series before 2001 must be separately check concerning the coverage in time and space.

It was request to ICES to calculate a combined index for cod based on the Solea survey in the western Baltic area and the Havfisken survey in the same area. The method for calculation of the index shall be the same as the method used for the BITS on Eastern cod.

Updates of the new index as well as the old separate indices will be available for the WGBFAS.

17 Provide index time series for the herring stock in the Central Baltic Sea (SD 25-27, 28.2, 29 and 32) at least back to 1991 (WGBFAS request)

WGBIFS was requested to provide WGBFAS for the herring stock assessment in the Central Baltic Sea (SD 25–27, 28.2, 29 and 32) with tuning fleet index time series at least back to 1991. Therefore the BIAS data in BAD1 format (ver. 12 which was corrected and updated with the survey data from 2007) were used to calculate the area coverage (Table 16.1), area correction factors (Table 16.2), and abundance and biomass estimates of herring for years 1991-2007. Using these abundance and biomass estimates and area correction factors, the area corrected abundance (Table 16.5) and biomass (Table 16.6) estimates for Central Baltic herring were calculated.

Table 16.1. Area coverage (NM^2) per Subdivision [25-29 and 32 (excl. Gulf of Riga)].

Year\SD	25	26	27	28	29	32
1991	9688.0	10467.8	5601.9	8799.4	6020.6	
1992	8511.5	10467.8	6324.5	8847.1	4584.4	
1993		4860.0		6100.6		
1994	10476.7	10619.4	6525.4	10917.6	5505.9	
1995	10836.9	10705.4	4717.1	10621.4		
1996	11601.3	10619.4	6777.1	10208.7	4584.4	
1997	5478.6	10705.4		10621.4		
1998	11450.5	10705.4	6777.1	10208.7	3664.1	
1999	11601.3	10705.4	6511.1	10621.4	9704.1	5366.0
2000	11601.3	10705.4	6511.1	10621.4	7792.7	5520.8
2001	11888.6	10705.4	6777.1	10917.6	6557.8	536.2
2002	11888.6	10705.4	6058.5	10917.6	6557.8	
2003	11888.6	10619.4	6324.5	10917.6	6557.8	536.2
2004	11888.6	10705.4	6324.5	10917.6	6557.8	536.2
2005	11888.6	10705.4	6058.5	10917.6	7330.6	536.2
2006	11888.6	9693.3	6324.5	10917.6	7330.6	4514.6
2007	11888.6	9705.4	6324.5	10917.6	9766.1	4116.8

Table 16.2. Calculated correction factors for areas per Subdivision [25-29 and 32 (excl. Gulf of Riga)].

Year\SD	25	26	27	28	29	32
1991	1.2672481	1.0344963	1.3894929	1.2569834	1.6865761	
1992	1.4424132	1.0344963	1.2307376	1.2502063	2.2149463	
1993		2.2281687		1.8130512		
1994	1.1718480	1.0197280	1.1928464	1.0131073	1.8442398	
1995	1.1328978	1.0115362	1.6501240	1.0413599		
1996	1.0582521	1.0197280	1.1485444	1.0834582	2.2149463	
1997	2.2409192	1.0115362		1.0413599		
1998	1.0721890	1.0115362	1.1485444	1.0834582	2.7712672	
1999	1.0582521	1.0115362	1.1954662	1.0413599	1.0463825	1.3971673
2000	1.0582521	1.0115362	1.1954662	1.0413599	1.3030400	1.3579916
2001	1.0326784	1.0115362	1.1485444	1.0131073	1.5484156	13.9820962
2002	1.0326784	1.0115362	1.2847735	1.0131073	1.5484156	
2003	1.0326784	1.0197280	1.2307376	1.0131073	1.5484156	13.9820962
2004	1.0326784	1.0115362	1.2307376	1.0131073	1.5484156	13.9820962
2005	1.0326784	1.0115362	1.2847735	1.0131073	1.3851799	13.9820962
2006	1.0326784	1.1171531	1.2307376	1.0131073	1.3851799	1.6606565
2007	1.0326784	1.1157603	1.2307376	1.0131073	1.0397395	1.8211232

Table 16.3. Abundance estimates (millions per age groups and by SD) of herring in SD 25-29 and 32 (excl. Gulf of Riga).

SD	Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
25	Age 0	491	87		925	576	26	1350	350	976	147	313	563	2560	862	672	396	327
25	Age 1	740	1010		582	807	368	394	782	714	615	577	437	1155	742	464	734	440
25	Age 2	660	869		789	419	1552	208	474	1214	429	1565	301	1522	1860	623	685	546
25	Age 3	842	1508		2645	666	1488	687	991	923	945	795	789	1437	1545	1721	1639	435
25	Age 4	399	1364		2095	1069	1541	396	1030	1107	339	1344	412	1425	1128	779	3014	704
25	Age 5	296	529		868	892	1037	194	418	781	597	411	285	498	830	732	969	1067
25	Age 6	98	196		262	672	529	78	152	265	434	317	78	420	161	390	604	282
25	Age 7	94	111		142	244	227	44	59	152	181	298	32	80	132	130	668	216
25	Age 8+	118	62		48	59	81	30	19	67	163	79	16	62	143	107	272	155
26	Age 0	4586	1003	554	640	523	272	926	117	586	644	832	459	619	650	564	335	357
26	Age 1	1533	2257	189	825	1071	524	496	456	523	765	409	579	753	252	430	754	369
26	Age 2	1862	1541	1107	936	388	876	783	160	697	279	675	331	792	613	433	474	404
26	Age 3	1506	2298	1537	2242	966	733	1385	464	382	934	410	895	885	714	938	1758	350
26	Age 4	563	1434	1862	2255	1702	844	956	915	541	481	787	401	1055	707	741	3193	651
26	Age 5	1535	678	1028	1402	1522	709	746	507	846	653	301	626	445	641	969	874	977
26	Age 6	535	458	524	617	1121	618	454	590	428	701	274	295	604	329	587	699	370
26	Age 7	704	332	278	337	511	292	229	282	267	276	290	281	266	276	308	303	267
26	Age 8+	814	236	401	258	302	231	134	199	303	222	188	159	454	284	491	352	296
27	Age 0	10	14		2287	91	0		10	10	1	95	878	1038	0	167	21	1391
27	Age 1	353	1208		691	1315	1223		1399	211	398	1458	397	2917	1130	263	1341	800
27	Age 2	1795	1589		1892	384	3925		466	709	80	2099	749	1923	3380	1615	818	875
27	Age 3	1153	2053		3273	668	2586		1636	259	509	542	1092	1723	1177	2564	1383	157
27	Age 4	356	753		1275	729	2022		1280	742	281	737	473	957	500	594	2019	298
27	Age 5	896	352		364	646	695		282	384	272	201	256	128	161	164	601	493
27	Age 6	97	158		89	178	95		142	63	226	76	48	71	44	113	174	75
27	Age 7	167	47		11	146	31		19	10	73	42	42	0	12	28	58	46
27	Age 8+	188	18		3	116	3		2	9	2	6	4	1	4	19	48	15
28	Age 0	1571	1	35	365	24	0	86	2	152	281	16	1241	504	25	466	23	173
28	Age 1	845	388	160	240	478	229	61	421	135	272	410	208	2762	470	143	497	394
28	Age 2	3621	825	1143	1860	706	2398	276	440	500	179	802	949	1487	2669	868	799	1176
28	Age 3	1510	2039	1867	5105	1566	1819	2155	1575	649	946	372	1229	4091	1957	3329	1555	845
28	Age 4	1098	1359	2031	4088	1702	1170	1330	1920	678	291	731	693	2179	1704	2010	2843	1426
28	Age 5	2345	1486	733	2543	1605	1548	928	1048	982	417	257	997	991	657	1668	830	1894
28	Age 6	505	992	490	995	930	944	438	542	543	459	219	419	580	524	1070	445	458
28	Age 7	457	757	260	408	451	544	132	388	312	250	125	362	387	166	418	183	151
28	Age 8+	465	640	468	494	254	417	104	191	206	208	142	265	615	230	450	126	152
29	Age 0	3809	193		698		14		0	760	167	538	8148	2586	10	2611	837	9209
29	Age 1	1593	748		723		636		333	73	6115	600	601	5396	1308	378	2572	3032
29	Age 2	5771	1500		3178		1860		177	1323	1183	1727	1080	1850	2471	3044	3615	3178
29	Age 3	3165	1603		3169		1232		541	808	4863	678	1383	1288	672	4298	4164	1045
29	Age 4	611	488		603		578		339	899	2573	575	454	489	292	2000	6554	891
29	Age 5	2036	159		107		108		59	495	2417	224	38	123	85	519	2729	2286
29	Age 6	614	38		27		17		5	71	1012	210	3	34	32	228	721	420
29	Age 7	366	15		3		8		0	63	1680	55	2	6	4	138	300	147
29	Age 8+	366	5		3		0		0	27	1109	27	3	3	4	30	254	140
32	Age 0									145	1121	2		94	1	102	516	761
32	Age 1									30	19274	5		772	26	16	1801	1157
32	Age 2									277	2662	18		241	42	192	1400	1200
32	Age 3									383	2542	14		143	12	571	2200	128
32	Age 4									156	2498	6		71	5	562	1239	182
32	Age 5									54	2289	2		42	1	61	456	1658
32	Age 6									22	1022	1		25	0	31	56	35
32	Age 7									13	444	1		1	0	0	11	23
32	Age 8+									14	294	0		8	0	3	14	19

Table 16.4. Biomass estimates (tons per age groups and by SD) of herring in SD 25-29 and 32 (excl. Gulf of Riga).

SD	Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
25	Age 0	5597	1161		6187	7977	188	14165	3904	12584	2274	4463	6662	28649	9702	7977	5001	3998
25	Age 1	27520	30524		13292	18851	5143	9538	17403	21424	20749	17406	14608	35627	16254	15304	23877	15521
25	Age 2	35039	35756		22110	16050	22701	7508	14711	48084	17924	57615	14570	70866	45558	23155	34414	25393
25	Age 3	48475	71643		98111	28865	28279	20435	32060	30968	39535	35624	37267	61925	53108	61815	69151	24744
25	Age 4	27121	84390		82183	55098	34535	12219	39865	41173	15263	54468	23794	72876	47524	33492	129412	33645
25	Age 5	15893	37250		36767	48216	26868	7860	18494	32582	26100	20779	16056	25790	36149	33116	53100	50948
25	Age 6	8991	16804		12695	41078	15554	3492	8258	12534	20574	16990	4889	21044	8368	21048	37315	16611
25	Age 7	10185	10217		8255	15237	8215	2264	3560	8184	9106	16421	2081	5603	7413	7546	43228	13169
25	Age 8+	12006	6252		2582	5345	5274	1614	1497	4047	9946	5338	1197	4136	7814	7422	18289	11049
26	Age 0	41732	12049	6645	2545	4044	1719	6187	1012	4479	5708	7185	4439	4192	4462	5050	2838	3925
26	Age 1	50425	53190	4301	12768	13925	9008	10249	9563	13960	17096	9706	18765	13846	4080	11697	19662	11649
26	Age 2	68507	38987	31581	20724	9809	15963	23139	4887	26040	8465	17463	14393	20291	14014	15048	16324	17194
26	Age 3	65948	71083	48571	52726	23237	14376	38689	12995	14682	28842	11265	37633	24990	21981	32119	55026	15636
26	Age 4	31239	56355	56009	51693	50834	17171	30451	27451	20396	15625	21249	17780	33983	23995	31530	103000	26973
26	Age 5	67244	32740	40458	35952	47109	15798	26553	16224	32991	23047	9552	28671	16664	24576	46091	38277	41877
26	Age 6	30693	27344	21571	21070	42055	17339	19362	21198	17567	26036	9521	15017	23909	14028	31888	35243	18835
26	Age 7	43959	22130	12630	14518	22317	9715	12341	11108	11945	12089	10705	15669	12206	11877	18003	17861	14958
26	Age 8+	60270	15981	25527	20367	17952	15185	11175	10292	15751	10657	8215	10320	22153	13944	32556	25813	19870
27	Age 0	69	109		8652	410	0		80	220	6	413	4010	3855	0	846	120	7372
27	Age 1	9596	18959		10876	17848	13704		14547	1220	6155	16628	6120	39533	11907	3887	17683	12258
27	Age 2	58874	42051		44834	8107	71107		8481	8241	1645	41492	18311	39193	50815	28294	18637	18857
27	Age 3	42543	65942		105820	15961	68240		32475	4250	11114	13120	33359	43706	24349	57719	34635	4151
27	Age 4	14816	30655		57861	21016	68826		31735	16821	6957	18633	18760	27258	11757	17002	55491	9188
27	Age 5	37259	19733		22535	21462	30985		7989	10002	7672	5823	11190	4538	4421	5065	19098	15379
27	Age 6	5367	10046		5994	8089	5473		4223	1726	7244	2366	2527	2489	1410	4443	7367	2711
27	Age 7	9688	3551		597	6099	1955		600	346	2765	1365	1964	0	381	1027	3085	1793
27	Age 8+	12076	1562		185	7734	266		204	396	60	448	185	62	186	1673	2329	723
28	Age 0	13354	8	455	1182	168	0	631	16	752	2436	171	6057	1157	162	2507	132	1272
28	Age 1	20037	8042	2853	4850	6822	3202	1387	5995	2296	5265	6824	4584	34018	5199	3317	6328	7956
28	Age 2	91614	19629	24516	40438	12944	34659	5178	8201	10181	4316	16133	23003	27864	39689	16999	13878	29437
28	Age 3	48624	58571	42767	133599	32816	30184	42293	31753	15386	23354	9053	34215	103425	37926	83140	34581	22313
28	Age 4	37015	43387	51938	115664	37350	22379	29910	42402	16874	7973	19914	21244	65488	40582	55831	72559	45974
28	Age 5	85609	52945	22245	74113	39338	32445	23097	25242	25779	11097	8246	30974	32163	17204	61628	27910	63447
28	Age 6	22453	38091	13942	36097	25929	22333	12181	13807	14671	13629	7390	13535	20864	15680	47651	15873	18616
28	Age 7	22952	33622	8427	13466	13728	13087	5011	12164	8995	7491	4215	12043	13757	5488	19950	8401	6559
28	Age 8+	28597	39278	19260	30041	11653	12759	8666	8556	6745	6391	4611	9661	36756	6751	24850	5791	6914
29	Age 0	20950	1130		2441		73		0	3472	757	2794	31709	5821	40	9592	3136	40381
29	Age 1	29306	11885		11398		6371		3679	988	86144	6482	11674	44286	11456	4764	30954	44231
29	Age 2	129842	37573		67835		28571		2943	22388	20358	27582	25024	26973	30128	46398	57290	58429
29	Age 3	77866	47575		83230		26073		10773	17168	95602	13547	37786	25034	11001	76171	76770	21915
29	Age 4	18459	17371		20517		14209		7521	22382	56470	12404	13430	11222	5194	41299	122998	20665
29	Age 5	61281	7054		4704		3180		1602	13350	52420	4884	1253	3351	1871	12624	62281	51300
29	Age 6	19417	2766		1201		728		143	2315	26319	5435	78	1068	755	6624	17934	9931
29	Age 7	13880	933		237		292		0	2323	39825	1511	53	197	74	4602	7336	4105
29	Age 8+	14014	488		787		0		0	1259	34228	957	116	92	102	1197	7578	4399
32	Age 0									610	8180	11		262	4	368	1667	3988
32	Age 1									382	227537	61		5595	236	144	16594	16729
32	Age 2									4347	40205	283		2809	442	1983	16586	20570
32	Age 3									7097	47411	246		2445	201	7223	28684	2756
32	Age 4									3253	48292	111		1342	85	8061	18717	3550
32	Age 5									1230	47108	49		936	12	1298	8334	29016
32	Age 6									560	23651	23		572	0	804	1212	803
32	Age 7									365	10243	26		15	0	0	255	533
32	Age 8+									698	8851	13		181	0	150	501	517

Table 16.5. Area corrected abundance estimates (millions per age groups and by SD) of herring in SD 25-29 and 32 (excl. Gulf of Riga).

SD	Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
25	Age 0	622	125		1084	653	28	3026	376	1033	156	324	582	2644	890	694	409	337
25	Age 1	937	1456		682	914	390	883	839	756	651	596	451	1193	766	479	758	455
25	Age 2	836	1253		925	474	1643	466	508	1285	454	1616	311	1572	1921	644	707	564
25	Age 3	1066	2175		3099	754	1574	1539	1063	977	1000	821	814	1484	1595	1777	1693	449
25	Age 4	505	1967		2455	1211	1630	886	1105	1172	359	1388	426	1472	1165	804	3113	727
25	Age 5	375	764		1017	1010	1097	436	449	826	631	424	294	514	857	755	1000	1101
25	Age 6	124	283		307	761	560	176	163	280	459	327	81	434	166	402	624	292
25	Age 7	119	161		166	276	240	98	64	161	192	308	33	82	136	134	690	223
25	Age 8+	149	89		57	67	86	67	21	71	173	81	16	64	148	111	280	160
26	Age 0	4744	1037	1234	653	529	277	937	119	593	651	841	464	631	657	571	374	398
26	Age 1	1586	2335	421	842	1083	535	502	461	529	774	414	585	768	255	435	842	411
26	Age 2	1926	1594	2467	954	393	894	792	162	705	282	683	334	808	620	438	529	451
26	Age 3	1558	2378	3425	2286	978	747	1401	470	386	945	415	905	902	723	949	1964	391
26	Age 4	582	1483	4148	2299	1722	860	967	926	548	487	796	405	1076	715	749	3567	727
26	Age 5	1588	701	2290	1430	1539	723	755	513	855	660	304	634	454	648	981	977	1090
26	Age 6	553	474	1167	629	1134	630	460	597	433	709	277	299	616	333	593	780	413
26	Age 7	729	343	619	344	517	297	231	286	270	279	294	284	272	279	312	338	298
26	Age 8+	842	244	894	263	305	236	136	201	306	225	190	161	463	288	496	393	330
27	Age 0	14	17		2728	151	0		11	12	1	109	1127	1278	0	215	26	1712
27	Age 1	490	1486		824	2169	1405		1607	253	475	1674	510	3590	1391	338	1651	984
27	Age 2	2494	1956		2257	634	4508		535	848	96	2411	963	2367	4160	2075	1007	1077
27	Age 3	1602	2526		3904	1102	2970		1879	310	608	623	1402	2120	1449	3294	1702	193
27	Age 4	495	927		1520	1204	2323		1470	887	335	846	607	1178	615	763	2484	367
27	Age 5	1244	434		434	1066	798		324	459	325	231	329	157	198	211	740	607
27	Age 6	134	194		106	293	109		163	75	270	87	61	87	54	145	214	92
27	Age 7	232	57		13	241	35		22	12	88	49	54	0	15	35	72	56
27	Age 8+	261	22		4	192	4		2	10	2	7	5	1	5	24	59	18
28	Age 0	1975	1	63	369	25	0	90	2	159	293	16	1257	511	25	472	23	176
28	Age 1	1063	485	289	244	498	248	64	456	141	283	415	210	2798	477	145	504	399
28	Age 2	4552	1032	2073	1884	735	2598	287	477	520	187	812	962	1506	2704	879	810	1192
28	Age 3	1898	2550	3384	5172	1631	1970	2244	1707	675	985	377	1245	4144	1983	3372	1576	856
28	Age 4	1381	1699	3683	4142	1773	1268	1385	2081	706	303	741	702	2208	1726	2037	2881	1444
28	Age 5	2948	1857	1329	2576	1672	1677	967	1135	1022	434	261	1011	1004	666	1690	841	1918
28	Age 6	634	1240	888	1008	969	1023	456	587	566	478	222	425	588	531	1084	451	464
28	Age 7	575	946	471	414	470	589	137	420	325	260	126	367	392	168	424	185	153
28	Age 8+	584	800	849	501	265	452	108	207	214	216	144	269	623	233	456	128	154
29	Age 0	6424	427		1288		31		0	795	218	833	12616	4004	15	3617	1159	9575
29	Age 1	2686	1656		1333		1408		923	76	7968	929	930	8356	2026	524	3563	3152
29	Age 2	9733	3322		5862		4121		489	1384	1542	2673	1673	2864	3825	4216	5007	3304
29	Age 3	5338	3551		5844		2728		1500	846	6337	1050	2141	1994	1040	5953	5768	1086
29	Age 4	1031	1081		1112		1281		941	940	3353	891	702	758	452	2771	9078	926
29	Age 5	3434	353		197		239		163	518	3150	347	59	191	132	719	3780	2377
29	Age 6	1036	83		49		37		14	75	1318	325	4	53	49	316	999	437
29	Age 7	618	32		5		17		0	66	2189	85	3	9	6	191	416	152
29	Age 8+	617	12		5		0		0	28	1445	42	5	5	7	41	352	146
32	Age 0									203	1522	26		1309	13	1421	857	1386
32	Age 1									43	26174	72		10798	357	218	2991	2107
32	Age 2									387	3615	259		3367	594	2682	2325	2186
32	Age 3									536	3452	190		1995	172	7990	3653	233
32	Age 4									217	3392	77		988	63	7859	2057	331
32	Age 5									76	3108	31		594	8	847	758	3019
32	Age 6									31	1388	14		344	0	440	93	63
32	Age 7									18	603	11		7	0	0	18	42
32	Age 8+									20	400	6		115	0	46	22	35

18 Review of outcomes of the Ad-hoc experts meeting on the Ecosystem approach and impacts for the surveys coordinated by the IBTSWG

A Commission Staff Working Paper "Report of the Ad Hoc Meeting of independent experts on Indicators and associated data requirements to measure the impacts of fisheries on the marine ecosystem" was presented. This report presented the results that build on the earlier reports of two SGRN meetings (SGRN 05-03, SGRN 06-01) and outputs of EC funded projects Indicators of Environmental Integration (INDENT) (Anon 2006) and Development of Indicators of the Environmental Performance of the Common Fisheries Policy (INDECO) (Anon 2007).

The report provides precise specifications for indicators that are considered to be operational or may be made operational if changes are made to existing data collection procedures as described in the DCR. The report with appendices provide a recommended name for the indicator, define the indicator, list the data required for calculation of indicator values, describe how the indicator should be calculated, describe the expected precision of supporting data, describe the existing availability of data collected under the DCR and list any issues that need to be considered by the EC before the indicator is introduced. No references to specific surveys have been made.

Table 17.1. Specifications of proposed indicators and the associated data requirements.

Code/Annex	Indicator	Data required	Precision level
1	**Conservation status of fish species**	**Species, length and abundance** from fisheries-independent research survey(s) for relevant marine region. Accurate reporting of these indicators require that all species that contribute to the indicator are consistently and reliably identified. Survey catches must be fully sorted (not sub-sampled) to ensure that all individuals of every species that contributes to the indicator are recorded.	Research survey should cover largest proportion of the marine region over the longest available time period. The indicator would be survey specific. The methods require that surveys are conducted annually in the same area with a standard gear.
2	**Proportion of large fish**		
3	**Mean maximum length of fishes**		
4	**Size at maturation of exploited fish species**	**Individual measurements of age, length, sex and maturity** from fisheries-independent research survey(s) for relevant marine region.	At least 100 individuals per age class but more fish will improve the power of this indicator.
5	**Distribution of fishing activities**	**Position and vessel registration** data based on VMS Available within two months of position reports being received, with all positions linked to the 6 level metier classification recommended in SGRN 06-03. This does not include vessels below 15 m.	Preference for position reports every half hour.
6	**Aggregation of fishing activities**		
7	**Areas not impacted by mobile bottom gears**		
8	**Discarding rates of commercially exploited species**(discarding can also include unwanted bycatch that is landed)	**Species, length and abundance of catches and discards** based on respectively logbooks and observer trips processed separately, **economic data** from regulation in draft. Data linked to the 6 level metier classification recommended in SGRN 06-03.	As specified in current discard regulation and (new DCR economic data collection)
9	**Discarding rates in relation to landed value** (discarding can also include unwanted bycatch that is landed)		
10	**Fuel efficiency of fish capture**	**Value of landings and cost of fuel.** Value calculated as the product of landings by species (revised DCR) and prices (revised DCR). Cost of fuel as defined in (new DCR economic data collection). The indicator would be calculated for each metier based on the six level classification recommended in SGRN 06-03 by marine region, quarter and year.	As specified in current DCR and proposed in (new DCR economic data collection)

ICES reviewed this report in October 2007 and welcomes the development of these indicators and the process to incorporate these indicators into the Data Collection Regulation (ICES, 2007). However, ICES notes that the additional monitoring of ecosystem approach indicators cannot come "free", or even necessarily particularly cheaply. ICES also has some concerns related to good coverage of the different ecosystem components (state indicators) and of necessary detailed information of the effort and metier of the fisheries, both spatially and temporally (pressure indicators).

The WGBIFS discussed the reports and supports the views of ICES and made comments on the data requirements for indicators 1–4. Indicators 5–10 were not considered.

The WGBIFS has the following comments:

Indicator 1–3

- *The requirement for complete sorting of survey catches (not sub-sampled) to ensure that all individuals of every species that contributes to the indicator are recorded.* This requirement cannot be implemented without consequences for costs (extension of survey time and increasing manpower demands) and efficiencies (less tows per day at sea).
- In some surveys the catches are often large and homogeneous and consist often of large quantities of small fish of the same length (e.g. sprat and sticklebacks) and complete sorting is not practical or even physically not possible.

All the surveys coordinated by BIFS have documented standard procedures for sampling and working up catches, which are believed to guaranty that the length distributions which are obtained are representative for the catch. Therefore, it is believed that the standard procedure for obtaining biological information is sufficient to satisfy the data demands connected to ecosystem indicator sampling. For a detailed description of the sampling procedure see the BITS sampling manual (Annex 6).

Indicator 4

- The WGBIFS notes that normally species are not aged during the survey. Age readings are almost always done in the laboratories at the national institutes after the survey.
- The sampling design for age and sexual maturity is based on length, and so it is not possible to guarantee 100 individuals per age class.
- A large number of fish and shell fish are not aged as it is not possible.
- Most exploited fish species are already sampled for age and sexual maturity (cod, herring, sprat, flounder).

There is some scope for additional sampling during night time. This could be used for e.g. trawling for plankton with light gears which can be operated by scientific crew and a minimum of vessel crew. Such additional investigations are already carried out for some countries (e.g. the monitoring of the abundance and distribution of Mnineopsis).

Annex 1: List of Participants

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Annex 2: WGBIFS Terms of Reference for the next meeting

The **Baltic International Fish Survey Working Group** [WGBIFS] (Chair: Henrik Degel*, Denmark) will meet in Lysekil, Sweden from 30 March to 3 April 2009 to:

a) combine and analyse the results of the spring and autumn 2008 acoustic surveys and experiments and report to WGBFAS;

b) update the hydro-acoustic databases BAD1 and FishFrame for the years 1991 to 2008;

c) plan and decide on acoustic surveys and experiments to be conducted in 2009 and 2010;

d) discuss the results from BITS surveys performed in autumn 2008 and spring 2009;

e) plan and decide on demersal trawl surveys and experiments to be conducted in autumn 2008 and spring 2009;

f) update and correct the Tow Database;

g) review and update the Baltic International Trawl Survey (BITS) manual;

h) review and update the Baltic International Acoustic Survey (BIAS) manual;

i) study the vertical distribution of the cod during the BITS survey in a situation with oxygen deficiency close to the bottom;

j) upload and development status of DATRAS and FishFrame;

k) discuss the implementation of rules for acoustic dealing with species of less important (i.e. unknown target strength)

Supporting Information

Priority:	The work of the Group is essential to the development of internationally coordinated trawl surveys and research on medium- and long-term changes of population structure of Baltic cod, herring and sprat stocks. These stocks are key elements of the Baltic Sea ecosystems.
Scientific Justification and relation to Action Plan:	The above Terms of Reference are set up to provide ACOM with information required to respond to requests for advice/information from the European Commission and Science Committees. The main objective of WGBIFS is to coordinate and standardise national research surveys in the Baltic for the benefit of accurate resource assessment of Baltic and Kattegat fish stocks. From 1996 to 2003 attention has been put on evaluations of traditional surveys, introduction of survey manuals and consideration of sampling design and standard gears as well as coordinated data exchange format. Since 1995 activities have been devoted to coordinate international coordinated demersal trawl surveys using the new standard gear TV3. Experiments have shown that the density of cod in the pelagic waters above the trawls in areas with oxygen deficiency must be taken into account for stock indices. Adapted survey design of BITS was discussed and the first combination of acoustic and trawl survey were considered for autumn 2007.

Scientific Justification and relation to Action Plan (Continued):	The most important future activities are to combine and analyze acoustic survey data for the Baltic Fisheries Assessment Working Group, develop a disaggregated hydro-acoustic database, plan and decide on acoustic surveys and experiments to be conducted. The quality assurance of ICES will require achievements towards a fully agreed calibration of processes and internationally agreed standards. [Action Numbers a): 1.2.1, 1.2.2 b): 1.2.2, 1.13.3 c): 1.11 d): 1.2.1, 1.2.2 e): 1.11, f): 1.11, g): 1.11, h): 1.13.4, 1.11 i): 1.13.4 j): 1.13.4 k): 1.13.4, 1.11]
Resource Requirements:	No special/additional resources required.
Participants:	Relevant scientists from all institutes that participate in WGBIFS coordinated fish surveys
Secretariat Facilities:	Normal secretariat facilities are necessary for running the meeting.
Financial:	
Linkages To Advisory Committees:	ACOM: The quality of stock assessments and management advice of Baltic herring, sprat and cod stocks.
Linkages To other Committees or Groups:	WGBFAS, SGMPB, Resource Management Committee, Fisheries Technology Committee/ Study Group on Target Strength Estimation in the Baltic Sea (SGTSEB), Baltic Committee
Linkages to other Organisations:	
Secretariat Marginal Cost Share:	ICES:80% EU:20%

Annex 3: Recommendations

RECOMMENDATION:	ADRESSED TO:
1. WGBIFS recommends that the area corrected stock indices from 2007 can be used in the assessment of the herring and sprat stocks in the Baltic Sea without any restrictions.	WGBFAS
2. WGBIFS recommends that the area corrected stock indices based on the acoustic surveys in May/June from 1999 to 2007 can be applied as additional time series (fleet) for tuning in the final assessment of the Baltic sprat stock biomass	WGBFAS
3. The WG recommends that the acoustic surveys in May should be continued.	
4. WGBIFS recommends that the May/June 1999-2007 BASS data can be applied as additional source of data (fleet) for tuning in the final assessment of the Baltic sprat stock biomass.	WGBFAS
5. WGBIFS recommends that the Sweden recalculates BAD 1 data before 2000 until end of 2008 and upload the recalculated data to FishFrame	Sweden
6. As the survey was conducted with only insignificant deviations from the plan the WGBIFS recommends that the result from the 4th quarter BITS survey in 2007 can be used without any restrictions by the WGBFAS	WGBFAS
7 As the survey was conducted with only insignificant deviations from the plan the WGBIFS recommends that the result from the 1st quarter BITS survey in 2008 can be used without any restrictions by the WGBFAS	WGBFAS
8 The main results of both acoustic surveys in May/June and October 2008 should be summarized and reported in standard report format (ICES CM 2002/G:05 Ref. H, Annex 5) and in BAD1 format to the acoustic surveys co-ordinator **(Niklas Larson, niklas.larson@fiskeriverket.se)** and the BAD1 manager **(Eberhard Götze, eberhard.goetze@vti.bund.de)** not later than one month before the ICES WGBIFS meeting of the next year.	Members of WGBIFS
9 It is recommended that the RV Dana and RV Argos should carry out acoustic investigations of the pelagic to clarify the vertical distribution of cod during bottom near oxygen deficiency. Both 4th quarter, 2008 and 1st quarter, 2009 should be included.Data will be analyzed by Niklas Larson at the IMR, Lysekil.	Sweden and Denmark
10 It is recommended that the data collected during the Ancylus survey are uploaded to DATRAS for documentation, data check and further analysis.	Sweden
11 It is recommended that all fish species are worked up during the Ancylus survey following the same procedure as established for the BITS.	Sweden
12 It is recommended that some work is done intercessional looking into the possibility to coordinate the Ancylus and the Havfisken survey in Kattegat to such degree that a combined index can be developed.	Sweden and Denmark
13 During the whole BITS cruises in quarter 4, 2008 and quarter 1, 2009, acoustic data using a ping interval of 0.3 s and a pulse duration of 0.256 ms should be collected by the RV Argos, the RV Dana and the RV Atlantniro. Other vessels may collect data according to their standard procedure.	All countries participating in the BITS

RECOMMENDATION:	ADRESSED TO:
14 It is recommended that an additional field in FishFrame acoustic table AB is added. The field should hold the fraction of cod in the species distribution	FishFrame Acoustic database
15 A minimal resolution of 10 m is recommended in the future in the NASC. Already existing data can be kept as a total NASC from the surface to the bottom but a later rearrangement to the standard is strongly advised.	FishFrame Acoustic database
16 It is recommended to complete the datasets in FishFrame Acoustic level 1 by uploading the missing data before the end of 2008.	All countries participating in the acoustic surveys
17 The feedback from the 4th quarter BITS surveys should be submitted to Germany using the proposed standard format not later than 20 December. Feedback from the 1st quarter survey should be submitted immediately after the survey.	All countries participating in the BITS surveys
18 All countries which participate in the cooperation of the BITS are encouraged to bring national data from before 1991and which can be regarded as precursors to the later BITS, to such standard of quality that they can be uploaded to DATRAS.	All countries participating in the BITS surveys
19 The WG recommends that the necessary changes in DATRAS are done in order to allow the Angylus and the Kattegat sole survey data to be uploaded in DATRAS.	ICES Data Centre
20 The WG recommends that text of the BITS manual is updated according to the instructions given in the WGBIFS report (section 10)	ICES Data Centre
21 It was request to ICES to calculate a combined index for cod based on the Solea survey in the western Baltic area and the Havfisken survey in the same area. The method for calculation of the index shall be the same as the method used for the BITS on Eastern cod.	ICES Data Centre

Annex 4: Whole time series for tuning indices

Table 1. Tuning fleet results for sprat (22–29).

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
1991	45804	39734	44324	3152	8857	2019	1944	2958	204984
1992	44309	31419	27078	10898	2207	3129	757	759	171656
1993	47033	67557	30226	24919	10416	2324	3028	1561	194111
1994	21011	60888	48563	19396	13346	5816	1035	1631	240162
1995	158397	17638	45989	24981	12957	5973	2329	1540	321359
1996	82298	158131	24987	30569	16173	8032	4575	1535	330612
1997	24681	97716	78960	14134	10084	3095	2629	1223	305748
1998	112155	24373	62469	39864	8747	5016	1680	1163	258588
1999	5951	96075	16669	36568	39142	5342	3361	1816	236815
2000	65256	3547	54088	6027	14556	16014	1604	2858	170653
2001	13107	38715	9343	37473	5567	13435	9248	4249	141295
2002	41508	17964	44393	7545	22231	2945	6067	5358	243356
2003	121293	41533	30502	25937	9685	14807	6157	10107	436714
2004	193053	75061	23643	14851	10080	4816	4806	6960	341268
2005	7368	128651	51438	11022	5702	3179	2656	3708	213722
2006	36544	11782	103298	32414	7938	4583	2111	2948	201618
2007	51885	21665	8174	26103	9801	1067	471	1578	120743

Table 2. Tuning fleet results for sprat (26 + 28).

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
1991	33320	17331	14153	369	2878	344	248	666	105331
1992	37946	23839	19543	7753	1253	2103	199	478	139783
1993	29932	29719	15050	12330	4523	967	1433	1161	99813
1994	19541	48259	21794	8680	4654	1739	106	535	146473
1995	106726	11388	31041	14912	7189	4651	1724	958	208563
1996	59104	96174	15794	16036	6692	2921	2259	645	201977
1997	5631	52389	47279	5032	6012	2106	1596	411	166234
1998	85272	10766	29671	19713	4181	2785	1049	1132	155332
1999	4395	52089	7045	12775	10648	1770	1652	1223	114968
2000	52970	2502	40460	2715	8480	7128	1016	1885	122085
2001	8711	24519	4276	23050	2522	6147	4120	1429	81642
2002	33369	9201	30643	3681	15163	760	3791	2431	140328
2003	64882	23090	9774	16500	3675	8720	1471	5333	208093
2004	61841	22586	7722	2933	3590	660	1625	1816	105031
2005	3482	36047	16465	5591	2601	1004	800	735	66724
2006	22779	6998	58160	15965	5911	2403	1461	1752	115431
2007	15130	10628	3676	10433	3301	786	207	612	44772

Table 3. Tuning fleet results for sprat on age 0 SD 26 + 28.

Year	Age0
1993	4755
1994	39314
1995	27245
1996	2236
1997	40179
1998	691
1999	22839
2000	4313
2001	6465
2002	32163
2003	62525
2004	2256
2005	18348
2006	24705
2007	3484

Table 4. SD 25-29 (excl. Gulf of Riga).

Year	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8+
1991	6762	19541	11463	3994	9590	2482	2272	2453
1992	7418	9157	13179	7157	4108	2274	1540	1167
1993	710	4540	6809	7831	3619	2054	1090	1744
1994	3925	11882	20306	11528	5654	2099	941	829
1995	4664	2236	4465	5909	5287	3157	1504	829
1996	3985	13763	9991	7362	4534	2359	1179	777
1997	1448	1545	5184	3238	2157	1091	467	311
1998	4286	2171	6618	6521	2584	1524	791	430
1999	1755	4743	3194	4252	3680	1428	833	630
2000	10152	2560	9874	4838	5201	3234	3007	2061
2001	4029	8196	3287	4662	1568	1238	862	464
2002	2687	4242	6509	2843	2327	870	741	455
2003	16705	9117	10645	6691	2320	1778	755	1156
2004	4914	13231	6790	4673	2501	1132	604	680
2005	1921	8251	15346	7124	4356	2541	1096	1129
2006	7317	8061	12702	21123	7337	3069	1701	1212
2007	5401	6588	2975	4192	7094	1697	883	808

Table 5. Corrected abundance (million) of the Baltic sprat stock resulted from the May 1999-2007 BASS surveys.

YEAR	Total	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8+
1999	185521	782	89756	67851	24698	2340	29	21	44
2000	-	-	-	-	-	-	-	-	-
2001	185173	14366	56327	21268	66193	9169	7555	9103	1192
2002	186524	29355	29530	56045	32508	23656	4189	5665	5575
2003	139355	45557	25655	12984	25266	8319	12051	2914	6608
2004	438266	228463	116764	24897	16627	21709	4958	13549	11300
2005	260881	8222	171383	43274	16510	7758	5601	4029	4104
2006	197876	26215	10480	111689	33826	8466	2764	1946	2493
2007	174676	68376	36739	8748	47304	9932	2084	678	816