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26–30 March 2007

Rostock, Germany



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1 Executive Summary

Highlights

- Acoustic surveys have been carried out in May since 1999 with increasing intensity. It could be shown that area corrected stock indices are suitable as new tuning fleet for the stock assessment of sprat (Section 2.2.3).
- The quality of cod data from the Baltic International Trawl Surveys which are stored in the DATRAS database and which are used for the stock assessment could be significantly improved based on the agreement (Section 5.2).
- First combination of trawl and acoustic surveys was planned for the Bornholm Basin in November 2007 to estimate the density of cod above the used bottom trawl in areas with oxygen deficiency (Section 10.1).

The Baltic International Fish Survey Working Group (WGBIFS) meeting took place in Rostock, Germany, and considered research on the ten Terms of Reference. Results of the acoustic surveys in May and October 2006 and of the trawl surveys in November 2006 and spring 2007 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, gill nets etc. In this regard, two additional trawl surveys were discussed by the group. Both surveys are realized in the Kattegat and partly in the Skagerrak by Denmark and Sweden. The surveys provide stock indices of sole and cod. Both stocks are assessed by the Baltic Fisheries Assessment Working Group (WGBFAS). WGBIFS agreed that the design and the results of both surveys will be discussed in the group in the future. The group pointed out that additionally, the survey of “Havfisker” in the Kattegat which is also targeting cod should be discussed in WGBIFS. The feedback from the trawl surveys was used to improve the Tow database. Additionally, stations were presented by some countries to improve the coverage of the Baltic Sea. Furthermore, the next trawl surveys in the autumn of 2007 and the spring of 2008 and special investigations during the trawl survey in November 2007 also were planned. Studies of the vertical distribution of cod in pelagic waters above the used bottom trawls in areas with oxygen deficiency close to the bottom have shown that combination of acoustic and bottom trawl methods are necessary to improve the quality of the estimated cod stock. Therefore, survey design was adapted according to the technical possibilities of participating vessels in the Bornholm Sea.

The results of the acoustic surveys have shown that the new design of the surveys where each rectangle is mandatory to be covered by each country improves the quality of the indices. It is recommended that the indices which are also based on the acoustic survey in October 2006 can be used for the assessment without any restrictions. The uncertainty of the different coverage of the total distribution area of sprat during the acoustic surveys in May was studied. It could be shown that correction factors can be used to minimize the effects of different coverage of the area and that the corrected values can be used as stock indices. Furthermore, different methods were discussed to improve the results of acoustic surveys by changing the stratification of the area under investigation and by changing the combining of the results of fishing stations during the surveys. It was pointed out that data of other years must be studied before the current used procedures of data handling can be changed. Additional studies are initiated and new survey designs will be discussed during next meeting of WGBIFS in Gdynia, Poland from 31 March to 4 April 2008.

2 Introduction

2.1 Participation

Michele Casini	Sweden
Henrik Degel	Denmark
Ole Folmer (part time)	Denmark
Pavel Gasyukov	Russia
Eberhard Götze	Germany
Włodzimierz Grygiel	Poland
Nils Håkansson	Sweden
Erkki Jaala	Finland
Ole A Jørgensen (part time)	Denmark
Olavi Kajuste	Estonia
Igor Karpushevskiy	Russia
Svetlana Kasatkina	Russia
Niklas Larson	Sweden
Domas Maciunas	Lithuania
Rainer Oeberst (Chair)	Germany
Jukka Pönni	Finland
Tiit Raid	Estonia
Matthias Schaber (part time)	Germany
Vladimir Severin	Russia
Ivo Sics	Latvia
Fausts Svecovs	Latvia
Henrik Svedang	Sweden
Andrés Velasco	Germany

2.2 Terms of Reference

According to Annual Science Conference Resolution (**2/LRC06**) in Maastricht, Netherlands last year the Baltic International Fish Survey Working Group [WGBIFS] (Chair: R. Oeberst, Germany) will meet in Rostock, Germany from 26 – 30 March 2007 to undertake the tasks as specified in (C.Res 2006/2LRC06):

- 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 2006;
- c) plan and decide on acoustic surveys and experiments to be conducted in 2007 and 2008;
- d) discuss and report on the results from BITS surveys performed in autumn 2006 and spring 2007;
- e) plan and decide on demersal trawl surveys and experiments to be conducted in autumn 2007 and spring 2008;
- 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 and produce report and recommendations;
- j) discuss the extension of the DATRAS data in time and space.

WGBIFS will report by 30 April 2006 for the attention of the Living Resources, the Baltic, and the Resource Management Committees.

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 ecosystems.

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

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 fish stocks. From 1996 to 2004 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. In recent years activities have been devoted to coordinate international coordinated demersal trawl surveys using the new standard gear TV3 and to continue the analyses of the conversion factors between the new and old survey trawls.

The most important future activities are to combine and analyze acoustic survey data for the Baltic Fisheries Assessment Working Group, develop a disaggregated hydroacoustic 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

Activity is related to the maintenance and strengthening of partnerships with national science institutes and to the elaboration and development of our knowledge of the stock structure, dynamics, and trophic relationships.

2.3 Overview of WGBIFS activities in 2002–2007

The seventh meeting of WGBIFS (ICES CM 2002/G:05, Ref. H) coordinated the planned international surveys. Furthermore, analyses were presented and discussed which estimate the conversion factors between the national gears and the new standard gears based on new intercalibration experiments. It was agreed that new intercalibration experiments are necessary. The results of the acoustic and trawl surveys carried out in autumn 2002 and spring 2003 were studied and the subsequent surveys to be conducted in autumn 2003 and spring 2004 were planned. Based on the analyses it was recommended that the estimated indices can be used by WG BFAS without any restrictions (ICES CM 2003/G:05 Ref. D, H). Proposed algorithm for selecting hauls from the Clear Tow Database which takes into account the spatial heterogeneity of available stations was discussed. Based on the feedback from the trawl surveys concerning the selected stations was used for updating the Clear Tow Database. The methods for estimating the conversion factors were discussed and new versions of conversion factors were estimated based on the total number of realized intercalibration experiments.

The main areas of discussion during the meeting in 2004 (ICES CM 2004/G:08, Ref. D, H) were besides the planning of the next surveys the improvement of the analyses of the available survey data. Based on the current hydrographical situation in the Baltic Sea which is characterized by large areas with oxygen deficiency close to the bottom available data of acoustic surveys were used to carry out first studies concerning the vertical distribution of cod in the pelagic waters during the trawl surveys. The group agreed and planned special experiments in November 2004.

Following intercessional main activities were initiated during the Meeting in 2005 (ICES CM 2005/G:08, Ref. D,H) besides the analysing of the data and the planning of new surveys. Preliminary studies of the data which are stored in the DATRAS database have shown that reworking of the database is necessary. Therefore, subgroup meeting were planned and realized to define additional criteria for checking the data. The reworking of the data of the period from 1991 to 2005 need a lot of time and is not finalized until now. Furthermore, experiments were planned to estimate the distribution of cod above the used standard gears during the BITS, and studies related to the uncertainties of the survey results were initiated.

Two main tasks were discussed during the meeting 2006 (ICES CM 2006/LRC:07, Ref. ACFM, BCC, RMC). The results of the workshop in Gdynia in January 2006 which was related to improve the quality of data which are stored in the DATRAS database and the density of cod in the pelagic waters above the used bottom trawl during the BITS. Additional procedures were developed to screen data which are stored in CA datasets and it was agreed that all countries rework the cod data from 1991 to 2005 until summer 2006 and the flounder data until September 2007. First studies which estimated cod in the pelagic waters during BITS in areas with oxygen deficiency close to the bottom suggested that this cod must be taken into account during the estimation of stock indices. To improve the knowledge and to quantify the cod in pelagic waters special experiments were defined to get estimates of cod in the pelagic water with higher accuracy. Furthermore, the results of the realized surveys were discussed and the next surveys were planned.

3 Combine and Analyse the Results of the 2006 Acoustic Surveys and Experiments and Report to WGBFAS

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

In 2006 the following acoustic surveys were conducted between September and November:

VESSEL	COUNTRY	AREA
ARGOS	Sweden	27 and parts of 25, 28, 29
ATLANTNIRO	Russia	Parts of 26 and 28
BALTICA	Poland	Parts of 24, 25 and 26
BALTICA	Latvia/Poland	Parts of 26 and 28
BALTICA	Finland	Parts of 29 and 32
BALTICA	Estonia	Parts of 28, 29, 32
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 had a mandatory responsible area. This means that the 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 Tables 3.1.9 and 3.1.10) during the international acoustic survey in October 2006. The Figure illustrates that the planned coverage of the Baltic Sea during the acoustic survey in October was realized.

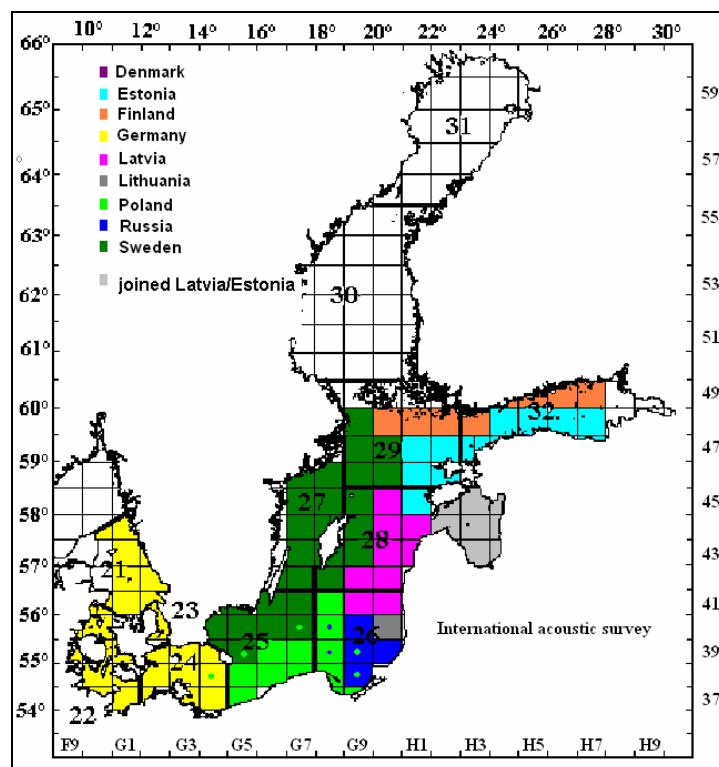


Figure 3.1. Map of surveys conducted in October 2006. Colours indicate the countries, which covered specific ICES-rectangles and delivered data to BAD1-database, thus was responsible for this rectangle. Coloured dots within a rectangle explain additional data in BAD1 partly or totally covered by other countries.

3.1.2 Total results

The stock indices which are based on the international acoustic survey in October 2006 are summarized 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 the last WGBIFS meeting possible improvement of 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 that should be covered of the subdivision (see 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 2006 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:

- acoustic in Subdivisions 22–29
- acoustic in Subdivisions 26 and 28

The results of both tuning fleets in 2006 are shown in Table 3.1.12 and 3.1.13 (including the results for the period 1991–2004). In this tables the above explained correction factor is included (see 4.1.3).

3.1.4.2 Herring in Subdivisions 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 are presented in Table 3.1.14.

3.1.5 Recommendation to WGBFAS

WGBIFS recommends that the area corrected data from 2006 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 2006 by rectangle.

SD	RECT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21	41G0	32.5	32.2	0.3							
21	41G1	490.8	391.3	89.2	5.7	2.4	1.4	0.1	0.8		
21	41G2	237.0	11.2	108.3	63.0	43.7	8.7	2.1			
21	42G1	36.4	10.0	23.1	2.4	0.7	0.1		0.1		
21	42G2	23.4	20.1	3.2					0.1		
21	43G1	383.3	365.2	18.0					0.2		
21	44G0	93.4	92.0	1.4							
21	44G1	179.7	170.5	9.2							
21 Total		1476.6	1092.4	252.8	71.1	46.8	10.2	2.2	1.1	0.0	0.0
22	37G0	76.7	75.8	0.9			0.0				
22	37G1	652.1	579.2	69.5	1.4	1.0	1.0				
22	38G0	418.6	397.4	19.9	0.4	0.7	0.3				
22	38G1	25.5	24.1	1.4							
22	39F9	3.5	3.4	0.1							
22	39G0	55.6	51.8	3.8			0.0				
22	39G1	4.3	4.3								
22	40F9	0.8	0.8								
22	40G0	262.4	261.8	0.5							
22	40G1	102.7	102.1	0.6							
22	41G0	16.6	16.3	0.3			0.0				
22 Total		1618.8	1517.0	97.0	1.7	1.7	1.4	0.0	0.0	0.0	0.0
23	40G2	646.0		6.4	45.8	152.0	158.9	117.7	79.3	60.0	25.9
23	41G2	331.1	270.0	60.5	0.7						
23 Total		977.1	270.0	66.9	46.5	152.0	158.9	117.7	79.3	60.0	25.9
24	37G2	60.0	54.1	4.0	0.5	0.6	0.7	0.1	0.1	0.0	
24	37G3	11.1	8.9	0.4	0.3	0.5	0.5	0.2	0.2	0.1	0.0
24	37G4	33.8	20.7	6.4	1.5	1.7	2.0	0.6	0.5	0.3	0.1
24	38G2	530.2	422.5	71.3	7.2	12.7	12.4	2.1	1.2	0.6	0.1
24	38G3	862.6	512.2	158.3	46.7	52.8	50.9	19.2	14.4	6.5	1.6
24	38G4	268.0	139.2	71.5	13.9	15.0	18.3	4.5	3.9	1.6	0.2
24	39G2	264.1	209.2	27.2	7.1	6.9	8.1	2.5	1.8	1.2	0.1
24	39G3	719.6	407.5	143.8	42.0	42.9	46.3	16.2	12.9	7.1	0.8
24	39G4	343.7	101.1	78.2	35.4	42.9	42.9	17.5	16.1	7.9	1.7
24 Total		3093.0	1875.4	561.0	154.7	176.0	182.1	63.0	51.0	25.2	4.6
25	37G5	121.0	0.9	11.3	12.0	18.9	42.2	13.9	8.6	10.3	3.0
25	38G5	985.0	7.0	92.1	97.9	153.8	343.7	113.0	69.6	83.6	24.4
25	38G6	410.0	1.4	23.3	49.2	53.6	116.0	53.5	38.3	57.6	17.1
25	38G7	426.0		49.2	40.1	77.4	160.3	41.4	24.8	25.0	7.8
25	39G4	63.6	4.9	12.4	6.8	12.0	17.2	6.2	0.3	3.5	0.3
25	39G5	603.8	18.4	69.1	88.5	112.7	166.2	68.7	35.7	26.4	18.1
25	39G6	482.0		26.7	53.2	59.2	135.2	67.4	47.4	69.4	23.5
25	39G7	1699.0		196.3	160.0	308.5	639.1	165.0	99.1	99.9	31.1
25	40G4	487.0	243.1	54.6	26.4	37.3	53.5	33.8	20.2	15.6	2.6
25	40G5	902.9	94.5	70.7	54.8	164.5	339.3	15.9	96.3	34.0	32.9
25	40G6	509.9	11.4	27.8	11.8	113.9	190.4	50.3	46.3	41.6	16.3
25	40G7	827.6	0.0	17.6	44.4	151.1	267.8	143.2	26.2	125.0	52.2
25	41G6	748.4	14.2	38.4	38.0	217.2	317.2	34.9	57.8	17.6	13.0
25	41G7	715.1	0.0	44.5	1.9	158.9	226.1	161.7	33.9	58.8	29.4
25 Total		8981.4	395.8	734.0	685.0	1639.1	3014.2	968.8	604.4	668.5	271.6
26	37G8	380.0	114.0	32.5	14.1	55.1	110.7	21.4	16.7	5.7	9.8
26	37G9	458.0	132.3	32.6	16.7	65.7	132.5	31.9	25.2	8.6	12.5
26	38G8	1656.0	8.2	161.2	88.7	320.0	649.8	154.4	150.0	60.0	63.8

SD	RECT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
26	38G9	958.5	48.3	73.3	51.6	142.2	239.7	131.6	92.4	73.9	105.4
26	39G8	1415.0	11.9	132.4	58.1	308.2	634.0	122.9	95.6	22.7	29.3
26	39G9	808.9		24.4	47.2	190.6	231.3	102.7	96.7	54.7	61.4
26	39H0	211.4	15.5	21.5	17.8	43.6	43.4	24.8	22.3	8.3	14.2
26	40G8	1869.0	2.0	244.2	105.0	407.7	786.4	147.9	112.6	32.1	31.2
26	40G9	460.3	2.4	5.3	36.5	123.6	160.9	77.2	32.4	7.2	14.8
26	41G8	304.9	0.0	4.5	15.6	51.7	131.5	34.0	41.3	23.8	2.5
26	41G9	31.2	0.0	1.3	4.0	7.6	12.3	3.0	1.4	0.9	0.7
26	41H0	187.4	0.0	20.6	18.4	41.7	60.9	22.4	12.0	5.1	6.3
26 Total		8740.6	334.8	753.8	473.6	1757.6	3193.2	874.2	698.6	302.9	351.9
27	42G6	460.1	2.1	3.4	40.4	80.7	203.5	71.5	27.8	21.0	9.6
27	42G7	281.0	0.0	20.5	10.2	50.7	107.2	21.2	36.1	18.5	16.6
27	43G7	359.2	0.7	55.6	29.2	106.5	99.1	48.6	16.1	3.5	0.0
27	44G7	776.1	0.0	54.3	47.3	223.2	268.8	159.2	14.6	4.7	4.0
27	44G8	27.4	3.3	10.1	3.8	4.0	5.2	0.3	0.6	0.0	0.0
27	45G7	1073.5	0.0	172.6	242.6	193.2	377.8	67.3	10.0	4.0	6.0
27	45G8	1603.1	4.7	353.0	221.9	338.8	573.1	51.5	52.9	0.0	7.2
27	46G8	1882.8	10.3	671.8	223.0	385.4	384.0	181.3	15.5	6.8	4.6
27 Total		6463.1	21.2	1341.3	818.3	1382.6	2018.7	600.9	173.7	58.5	48.0
28	42G8	1319.5	0.0	6.6	56.1	288.1	543.2	215.2	96.0	73.0	41.3
28	42G9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	42H0	73.1	0.0	28.9	12.2	11.1	15.7	1.4	3.2	0.5	0.1
28	43G8	1706.3	5.1	41.0	57.6	508.2	821.3	106.4	64.2	60.1	42.5
28	43G9	332.0	0.9	43.9	28.1	42.5	158.1	45.3	9.6	2.8	0.9
28	43H0	163.9	0.0	52.6	26.0	28.5	39.9	6.1	8.0	2.1	0.8
28	43H1	45.9	0.0	17.3	7.2	6.8	11.5	1.1	1.7	0.3	0.0
28	44G9	791.0	7.5	29.7	127.5	151.5	318.9	77.0	65.5	10.5	2.8
28	44H0	309.2	0.0	24.6	45.6	73.6	98.9	35.4	18.4	3.4	9.4
28	44H1	999.5	0.0	132.0	141.7	229.2	294.1	115.2	67.5	13.2	6.5
28	45G9	106.8	3.3	30.6	11.3	21.3	37.3	1.1	1.5	0.4	0.0
28	45H0	665.6	2.8	17.2	83.1	91.3	243.3	133.8	70.0	10.3	13.8
28	45H1	789.0	3.0	73.2	202.8	103.1	261.2	92.0	39.8	6.2	7.8
28 Total		7301.7	22.6	497.3	799.1	1555.3	2843.4	830.0	445.3	182.7	125.9
29	46G9	105.1	91.0	7.7	1.3	3.8	1.3	0.0	0.0	0.0	0.0
29	46H0	364.3	248.9	35.9	37.1	20.5	17.7	4.2	0.0	0.0	0.0
29	46H1	1946.2	0.0	187.8	325.1	342.3	673.5	267.3	84.1	31.4	34.7
29	46H2	4.8	3.5	0.2	0.2	0.2	0.5	0.1	0.0	0.0	0.0
29	47G9	2446.1	150.1	259.6	215.8	575.1	731.1	357.9	82.6	39.2	34.8
29	47H0	511.3	191.7	76.2	77.9	87.6	66.8	10.3	0.0	0.0	0.7
29	47H1	6092.2	27.3	581.8	977.1	1104.7	2173.6	832.0	234.5	94.6	66.5
29	47H2	7266.8	60.2	704.5	1167.1	1309.0	2576.5	982.5	276.9	111.8	78.4
29	48G9	3008.7	64.0	718.3	813.4	720.9	312.6	274.3	43.2	23.0	38.9
29 Total		21745.4	836.7	2572.0	3615.0	4164.1	6553.6	2728.7	721.4	300.0	254.1
32	47H3	645.7	80.0	76.3	103.7	198.2	127.7	51.9	4.6	1.1	2.2
32	47H4	230.8	7.7	25.3	37.4	77.0	54.7	24.8	2.3	0.5	1.1
32	48H3	314.4	24.9	100.9	61.9	85.1	33.3	7.8	0.3	0.2	0.0
32	48H4	2247.8	98.2	266.9	362.3	733.7	516.4	232.8	21.9	5.4	10.2
32	48H5	1758.1	95.2	514.0	354.7	483.9	231.1	65.4	12.0	1.8	0.0
32	48H6	496.5	38.2	203.0	86.3	110.0	46.8	10.5	1.4	0.3	0.0
32	49H5	1499.7	99.4	372.4	317.2	429.8	205.2	61.0	13.0	1.7	0.0
32	49H6	500.1	72.4	242.6	76.9	81.9	23.8	2.0	0.6	0.0	0.0
32 Total		7693.1	516.0	1801.3	1400.3	2199.8	1238.9	456.1	56.2	10.9	13.5
Grand Total		68090.7	6881.7	8677.3	8065.3	13075.0	19214.6	6641.6	2831.0	1608.7	1095.4

Table 3.1.2. Estimated numbers (millions) of sprat October 2006 by rectangle.

SD	RECT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21	41G0	3.4	0.1	0.5	2.2	0.6					
21	41G1	71.2	0.6	16.9	42.1	11.4	0.2				
21	41G2	211.5	10.1	33.2	110.4	49.1	8.2		0.4		
21	42G1	12.5	0.2	1.1	8.7	2.4	0.1				
21	42G2	59.3	0.3	13.3	35.4	9.7	0.5				
21	43G1	0.0									
21	44G0	45.3	11.1	11.0	18.8	4.2	0.3				
21	44G1	0.0									
21	Total	403.2	22.2	76.0	217.6	77.4	9.5	0.0	0.4	0.0	0.0
22	37G0	467.2	460.8	2.1	1.1	2.9	0.2				
22	37G1	1530.5	843.8	79.9	73.0	478.4	50.6	3.3		1.5	
22	38G0	230.8	228.5	0.9	0.2	0.7	0.4	0.1		0.0	
22	38G1	136.8	133.0	1.7	0.3	1.6	0.2			0.0	
22	39F9	99.4	98.6	0.7							
22	39G0	62.7	46.4	7.4	2.3	5.7	0.8			0.1	
22	39G1	207.3	206.4		0.2	0.7	0.1				
22	40F9	37.6	37.6								
22	40G0	311.9	307.3	2.2	0.7	1.4	0.3			0.0	
22	40G1	24.9	24.2	0.3	0.1	0.3	0.0				
22	41G0	0.6	0.3	0.2	0.1	0.1	0.0				
22	Total	3109.8	2386.8	95.5	78.0	491.9	52.6	3.4	0.0	1.6	0.0
23	40G2	66.7	17.0	19.5	12.5	13.4	3.5	0.7			
23	41G2	12.6	2.6	5.0	2.5	2.0	0.3	0.1			
23	Total	79.3	19.7	24.6	15.1	15.4	3.9	0.8	0.0	0.0	0.0
24	37G2	1197.1	1130.9	42.4	11.0	8.2	4.1	0.6			
24	37G3	6884.2	6884.2								
24	37G4	302.2	245.2	22.5	10.4	17.4	5.1	1.2	0.4		
24	38G2	1940.2	1791.4	67.9	22.7	41.6	12.7	2.8	1.3		
24	38G3	7238.3	6132.3	442.2	186.8	352.2	94.6	22.4	7.8		
24	38G4	1519.9	1089.6	169.7	78.2	131.4	38.6	9.4	3.0		
24	39G2	639.5	631.1	3.6	1.4	2.4	0.7	0.1	0.1		
24	39G3	2184.0	876.5	474.6	232.7	435.9	128.0	27.2	9.2		
24	39G4	1050.7	570.2	200.7	80.3	143.5	42.0	10.8	3.2		
24	Total	22956.2	19351.4	1423.5	623.6	1132.7	325.8	74.5	24.9	0.0	0.0
25	37G5	74.0	2.8	9.1	12.4	25.1	12.1	6.7	3.1	1.9	0.8
25	38G5	601.0	22.9	74.3	100.7	203.7	98.2	54.7	25.4	15.0	6.1
25	38G6	27.0	11.4	4.0	2.4	5.2	2.3	1.0	0.3	0.3	0.1
25	38G7	7.0		1.3	1.3	2.7	1.2	0.3	0.1	0.1	0.0
25	39G4	73.9	1.5	6.4	6.2	45.0	6.9	0.4	0.0	0.0	7.3
25	39G5	442.2	11.2	100.9	0.0	233.6	54.9	13.1	22.8	0.0	5.8
25	39G6	108.0	47.7	21.3	9.3	20.7	7.2	1.3	0.4	0.1	0.1
25	39G7	26.0		5.0	4.7	9.9	4.5	1.2	0.4	0.2	0.1
25	40G4	1283.5	423.7	207.3	76.5	358.6	197.5	18.7	0.0	1.2	0.0
25	40G5	679.1	11.6	50.9	21.1	434.7	43.3	10.3	105.5	0.0	1.7
25	40G6	24.8	0.0	0.4	1.8	11.6	2.6	4.1	0.0	4.3	0.0
25	40G7	124.8	0.9	24.5	5.3	55.0	8.2	18.0	3.4	9.2	0.3
25	41G6	692.3	2.0	24.5	59.3	333.6	112.9	81.2	35.2	41.0	2.7
25	41G7	64.7	0.4	6.8	0.0	28.1	16.3	5.5	7.3	0.1	0.1
25	Total	4228.2	536.2	536.7	300.8	1767.5	568.2	216.6	203.9	73.2	25.1
26	37G8	544.0	84.2	106.8	32.1	209.8	74.7	29.6	5.7		1.2
26	37G9	2522.0	394.3	859.4	183.7	786.9	217.8	74.0	5.9		
26	38G8	1101.0		207.6	70.7	534.0	194.7	78.8	13.6		1.6

SD	RECT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
26	38G9	6802.7	2012.3	1859.8	302.6	2051.0	424.5	84.6	4.8	53.0	10.0
26	39G8	2175.0	161.9	519.2	147.0	858.9	307.1	140.6	38.2		2.2
26	39G9	1819.7	3.0	221.9	112.0	925.4	368.6	99.2	36.7	39.1	13.7
26	39H0	3348.8	934.1	1554.2	237.8	565.6	48.7	5.3	3.4	0.0	0.0
26	40G8	5743.0	211.0	737.2	299.8	2729.0	1083.3	521.7	154.9		6.2
26	40G9	2280.2	26.8	414.9	174.7	1289.9	185.4	46.8	62.7	38.6	40.5
26	41G8	2738.3	0.0	244.5	140.2	1024.5	528.4	419.1	79.9	165.7	136.1
26	41G9	3502.1	8.1	286.3	66.6	1930.7	800.8	122.5	87.4	134.5	65.2
26	41H0	5794.0	1564.1	1952.8	210.6	1609.3	287.6	141.3	0.0	17.0	11.4
26 Total		38370.9	5399.8	8964.5	1977.8	14515.0	4521.3	1763.6	493.4	447.8	288.0
27	42G6	240.4	33.8	24.0	18.5	76.1	37.9	34.6	2.2	4.4	8.9
27	42G7	2058.4	21.5	141.5	71.7	1269.2	475.3	55.8	9.2	14.2	0.0
27	43G7	2482.4	367.8	171.4	75.6	1366.6	308.5	29.6	32.9	37.5	92.5
27	44G7	1212.7	109.8	63.3	69.2	383.4	395.7	29.7	29.2	47.9	84.5
27	44G8	1328.2	692.5	79.7	0.0	403.1	90.7	23.8	23.8	0.0	14.7
27	45G7	3057.2	949.0	208.5	302.6	596.4	620.4	108.1	163.0	41.2	67.9
27	45G8	1659.3	200.6	61.9	82.0	893.1	185.8	28.2	12.8	69.2	125.6
27	46G8	3004.8	1476.1	236.1	32.3	833.6	261.2	22.4	95.5	27.7	20.0
27 Total		15043.4	3851.1	986.5	651.7	5821.5	2375.4	332.3	368.7	242.2	414.0
28	42G8	440.8	0.0	28.0	29.0	154.4	122.6	49.3	8.4	4.9	44.2
28	42G9	3816.1	5.2	254.7	164.0	2586.2	599.6	138.4	22.1	0.0	45.8
28	42H0	7289.9	14.0	1474.5	281.2	3367.1	905.2	706.5	204.6	200.3	136.5
28	43G8	2023.6	72.7	23.1	194.7	1145.6	474.2	35.2	49.7	0.0	28.3
28	43G9	3903.1	209.1	156.9	168.5	1987.1	1042.6	261.5	60.8	11.0	5.5
28	43H0	11376.6	22.1	1541.2	461.0	6322.7	1017.6	993.8	455.4	331.9	231.0
28	43H1	2684.4	209.8	593.8	82.6	1120.3	189.1	256.4	97.9	74.3	60.2
28	44G9	7115.1	662.7	932.2	614.1	3326.5	858.4	262.3	77.4	68.7	312.9
28	44H0	9045.8	228.6	761.7	239.5	4610.2	1681.3	811.6	280.0	119.7	313.2
28	44H1	5994.3	1570.0	1977.8	35.8	1877.3	261.3	140.8	50.3	21.9	59.1
28	45G9	7664.3	4551.5	330.6	73.0	2132.7	175.3	17.2	311.4	0.0	72.5
28	45H0	5551.9	973.0	861.3	416.0	2170.3	804.3	107.7	87.1	49.9	82.3
28	45H1	29105.9	9912.7	3663.6	1966.9	10602.2	2641.8	109.1	122.6	66.3	20.7
28 Total		96011.7	18431.5	12599.5	4726.4	41402.6	10773.3	3889.8	1827.8	948.8	1412.0
29	46G9	3969.8	1497.6	420.1	33.6	1102.7	846.5	10.5	5.3	33.6	20.0
29	46H0	3552.9	452.1	300.8	251.7	1710.7	418.4	283.8	69.5	0.0	66.0
29	46H1	8166.0	2032.3	1413.7	290.3	3215.7	1037.4	49.4	81.1	26.3	19.7
29	46H2	5015.3	4073.2	440.7	40.5	375.7	76.2	3.0	6.0	0.0	0.0
29	47G9	2122.0	340.8	180.6	156.5	764.9	287.1	175.8	105.5	2.8	108.1
29	47H0	5989.0	1107.2	652.6	65.4	2698.4	1240.4	127.8	62.9	6.1	28.0
29	47H1	11109.3	178.5	1500.9	527.3	6161.9	2145.6	125.6	316.7	55.5	97.2
29	47H2	16420.8	466.2	2614.1	760.4	8840.5	2989.1	165.2	405.2	65.5	114.7
29	48G9	129.6	5.0	11.1	0.0	28.1	21.7	8.6	24.3	7.9	22.8
29 Total		56474.7	10152.9	7534.6	2125.7	24898.6	9062.4	949.6	1076.5	197.8	476.4
32	47H3	9570.7	1481.4	2513.0	836.5	3133.4	1342.7	167.2	40.0	13.1	43.3
32	47H4	972.2	432.7	184.8	52.1	191.1	85.4	13.3	8.2	0.7	4.0
32	48H3	11336.5	299.5	3518.7	1200.4	4093.2	1869.4	217.7	80.0	14.4	43.1
32	48H4	31473.8	4813.8	7385.4	3052.7	10544.3	4768.7	546.7	157.1	46.7	158.4
32	48H5	9606.8	1092.7	4353.4	654.0	2314.4	1035.6	95.9	20.3	10.1	30.4
32	48H6	7450.9	1137.7	2952.7	511.2	1906.9	817.5	86.6	12.8	6.4	19.2
32	49H5	5179.0	682.9	2441.5	317.4	1158.9	516.5	46.4	5.1	2.6	7.7
32	49H6	12672.2	2286.7	4704.9	843.3	3272.7	1368.2	154.2	14.1	7.0	21.1
32 Total		88262.1	12227.3	28054.3	7467.7	26614.9	11803.9	1328.1	337.6	101.1	327.2
Grand Total		324939.5	72378.9	60295.7	18184.5	116737.5	39496.3	8558.5	4333.1	2012.5	2942.8

Table 3.1.3. Estimated numbers (millions) of herring October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	1476.6	1092.4	252.8	71.1	46.8	10.2	2.2	1.1	0.0	0.0
22 Total	1618.8	1517.0	97.0	1.7	1.7	1.4	0.0	0.0	0.0	0.0
23 Total	977.1	270.0	66.9	46.5	152.0	158.9	117.7	79.3	60.0	25.9
24 Total	3093.0	1875.4	561.0	154.7	176.0	182.1	63.0	51.0	25.2	4.6
25 Total	8981.4	395.8	734.0	685.0	1639.1	3014.2	968.8	604.4	668.5	271.6
26 Total	8740.6	334.8	753.8	473.6	1757.6	3193.2	874.2	698.6	302.9	351.9
27 Total	6463.1	21.2	1341.3	818.3	1382.6	2018.7	600.9	173.7	58.5	48.0
28 Total	7301.7	22.6	497.3	799.1	1555.3	2843.4	830.0	445.3	182.7	125.9
29 Total	21745.4	836.7	2572.0	3615.0	4164.1	6553.6	2728.7	721.4	300.0	254.1
32 Total	7693.1	516.0	1801.3	1400.3	2199.8	1238.9	456.1	56.2	10.9	13.5
Grand Total	68090.7	6881.7	8677.3	8065.3	13075.0	19214.6	6641.6	2831.0	1608.7	1095.4

Table 3.1.4. Estimated numbers (millions) of sprat October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	403.2	22.2	76.0	217.6	77.4	9.5	0.0	0.4	0.0	0.0
22 Total	3109.8	2386.8	95.5	78.0	491.9	52.6	3.4	0.0	1.6	0.0
23 Total	79.3	19.7	24.6	15.1	15.4	3.9	0.8	0.0	0.0	0.0
24 Total	22956.2	19351.4	1423.5	623.6	1132.7	325.8	74.5	24.9	0.0	0.0
25 Total	4228.2	536.2	536.7	300.8	1767.5	568.2	216.6	203.9	73.2	25.1
26 Total	38370.9	5399.8	8964.5	1977.8	14515.0	4521.3	1763.6	493.4	447.8	288.0
27 Total	15043.4	3851.1	986.5	651.7	5821.5	2375.4	332.3	368.7	242.2	414.0
28 Total	96011.7	18431.5	12599.5	4726.4	41402.6	10773.3	3889.8	1827.8	948.8	1412.0
29 Total	56474.7	10152.9	7534.6	2125.7	24898.6	9062.4	949.6	1076.5	197.8	476.4
32 Total	88262.1	12227.3	28054.3	7467.7	26614.9	11803.9	1328.1	337.6	101.1	327.2
Grand Total	324939.5	72378.9	60295.7	18184.5	116737.5	39496.3	8558.5	4333.1	2012.5	2942.8

Table 3.1.5. Estimated biomass (in tonnes) of herring October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	42548.3	19102.8	12664.8	5293.7	4083.4	1120.0	248.2	40.8	0.0	0.0
22 Total	19257.2	15559.7	3377.7	121.8	158.5	44.7	0.0	0.0	0.0	0.0
23 Total	112874.4	2883.1	2669.6	5553.2	20410.9	25458.9	22017.9	15470.3	12421.0	5992.3
24 Total	81785.6	18054.7	20814.5	8734.6	11236.3	10857.1	4966.3	4410.4	2182.6	524.4
25 Total	420972.6	5001.5	23877.4	34414.0	69151.3	129411.9	53099.7	37315.2	43228.3	18289.3
26 Total	314275.2	2853.9	19707.6	16375.6	55140.0	103158.7	38443.8	35251.1	17856.2	57358.3
27 Total	154288.3	119.5	17682.8	18636.7	34635.4	55491.0	19097.5	7367.2	3084.5	2329.3
28 Total	188458.8	132.1	6327.6	13878.5	34581.0	72559.3	27909.6	15872.7	8400.7	5790.9
29 Total	392293.5	3135.5	30954.1	57289.9	76769.6	122998.1	62281.3	17934.5	7336.0	7577.6
32 Total	92551.0	1666.9	16594.2	16586.5	28684.2	18716.8	8334.1	1212.3	255.2	500.7
Grand Total	1819305.0	68509.7	154670.4	176884.5	334850.6	539816.4	236398.5	134874.5	94764.4	98363.0

Table 3.1.6. Estimated biomass (in tonnes) of sprat October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	6716.0	81.3	1066.3	3814.3	1511.5	229.6	0.0	12.3	0.0	0.0
22 Total	24518.1	11877.8	1365.2	1292.6	8920.2	959.8	75.4	0.0	25.9	0.0
23 Total	1098.9	84.5	347.5	259.4	307.8	81.9	17.6	0.0	0.0	0.0
24 Total	131966.7	79462.5	17648.1	9239.4	18759.6	5165.4	1259.9	479.7	0.0	0.0
25 Total	50183.1	2222.7	5162.8	4071.7	24513.6	8588.3	3649.0	3250.1	1262.2	438.6
26 Total	352717.9	22262.1	77448.8	18975.2	149067.1	49282.4	20521.0	6428.0	5518.7	3618.9
27 Total	129605.2	14752.1	6834.0	6591.6	62460.4	26231.4	4541.7	4861.0	3473.1	5986.4
28 Total	725519.4	61677.1	89864.5	38316.0	352331.1	97201.6	38244.0	19368.8	10210.9	16839.9
29 Total	407544.8	28030.3	48418.2	17924.6	211282.3	80476.9	10272.4	11875.0	2346.2	6050.7
32 Total	567536.6	38509.8	169127.9	55491.9	197370.4	88622.5	10595.7	3681.0	959.2	3178.2
Grand Total	2397406.6	258960.2	417283.3	155976.8	1026523.9	356839.6	89176.7	49956.1	23796.2	36112.6

Table 3.1.7. Calculated correction factor for 2006 per Subdivision.

SD	AREA *	AREA COVERED	CORR. FACTOR
21	4604	4497	1.02379073
22	3459	3390	1.02060654
23	367	236	1.55377836
24	5665	5665	1
25	12277	11889	1.03268146
26	10829	9693	1.11714465
27	7784	6325	1.23074515
28	11061	10918	1.01310157
29	10154	7331	1.38518922
32	7497	4515	1.66065699

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

Table 3.1.8. Corrected numbers (millions) of herring October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	1511.7	1118.4	258.8	72.8	47.9	10.5	2.3	1.2	0.0	0.0
22 Total	1652.1	1548.2	99.0	1.8	1.7	1.4	0.0	0.0	0.0	0.0
23 Total	1518.1	419.4	104.0	72.2	236.1	246.8	182.9	123.2	93.2	40.2
24 Total	3093.0	1875.4	561.0	154.7	176.0	182.1	63.0	51.0	25.2	4.6
25 Total	9274.9	408.7	758.0	707.4	1692.7	3112.7	1000.5	624.1	690.3	280.5
26 Total	9764.5	374.0	842.1	529.1	1963.5	3567.3	976.6	780.4	338.4	393.1
27 Total	7954.4	26.0	1650.8	1007.1	1701.7	2484.5	739.6	213.8	72.0	59.1
28 Total	7397.3	22.9	503.8	809.6	1575.7	2880.7	840.9	451.2	185.1	127.5
29 Total	30121.5	1158.9	3562.7	5007.4	5768.1	9078.0	3779.8	999.2	415.6	351.9
32 Total	12775.6	857.0	2991.3	2325.4	3653.0	2057.4	757.5	93.3	18.2	22.5
Grand Total	85063.3	7808.9	11331.5	10687.5	16816.4	23621.4	8342.9	3337.4	1837.9	1279.4

Table 3.1.9. Corrected numbers (millions) of sprat October 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
21 Total	412.8	22.8	77.8	222.8	79.3	9.7	0.0	0.5	0.0	0.0
22 Total	3173.8	2436.0	97.5	79.6	502.0	53.7	3.4	0.0	1.7	0.0
23 Total	123.3	30.5	38.2	23.4	23.9	6.0	1.2	0.0	0.0	0.0
24 Total	22956.2	19351.4	1423.5	623.6	1132.7	325.8	74.5	24.9	0.0	0.0
25 Total	4366.4	553.8	554.2	310.7	1825.3	586.7	223.7	210.5	75.6	25.9
26 Total	42865.8	6032.3	10014.7	2209.5	16215.4	5051.0	1970.2	551.2	500.3	321.7
27 Total	18514.6	4739.8	1214.1	802.1	7164.8	2923.5	408.9	453.8	298.0	509.5
28 Total	97269.6	18673.0	12764.6	4788.4	41945.0	10914.5	3940.8	1851.7	961.2	1430.5
29 Total	78228.1	14063.7	10436.9	2944.5	34489.3	12553.2	1315.4	1491.2	274.0	659.9
32 Total	146573.1	20305.3	46588.5	12401.3	44198.3	19602.3	2205.5	560.6	167.8	543.4
Gran Total	414483.7	86208.5	83210.0	24405.8	147575.9	52026.3	10143.5	5144.3	2278.6	3491.0

Table 3.1.10. Rectangles covered by two countries and results from each country for estimated herring biomass.

VESSEL	SD	RECT	USED OR NOT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
BAL06	24	38G4	not used	6614	75.1	2341.4	816.7	1209.3	1598.6	361.7	129.8	33.1	53.5
SOL06	24	38G4	used	6864	1364.3	2692.0	674.6	746.9	839.2	226.6	217.2	88.9	13.4
ATL06	26	38G9	used	41791	420.3	1935.9	1887.5	5462.0	8366.2	6698.4	5969.0	4936.5	26694.9
BAL06	26	38G9	not used	39766	50.4	2796.8	2161.8	6706.4	13119.9	4751.6	4997.8	2177.5	3046.9
ARG06	25	39G5	used	26537	243.0	1828.9	4692.1	5694.5	8368.1	4064.5	2257.2	1651.3	1259.2
BAL06	25	39G5	not used	31658	63.1	2453.0	3419.4	4616.0	10085.8	4188.3	2565.8	3222.0	1020.7
ATL06	26	39G8	not used	24829		1748.8	1520.2	3341.2	8582.8	2914.7	1962.3	1290.9	6703.2
BAL06	26	39G8	used	48818	83.5	3852.8	2215.1	9769.3	20160.2	5332.6	4129.1	1233.2	2070.9
ATL06	26	39G9	used	34702		652.6	1634.5	5641.2	8048.2	4085.5	5301.4	3089.4	13014.7
BAL06	26	39G9	not used	21565	24.8	2576.6	1170.9	4558.0	9293.3	1934.2	1211.0	367.2	434.9
ARG06	25	40G7	used	41195		489.8	1848.7	6612.1	10859.1	7434.0	1944.5	8116.4	3104.6
BAL06	25	40G7	not used	22099		2548.2	2524.4	3812.5	7694.6	2107.6	1460.8	1489.6	459.1
ATL06	26	40G8	not used	12570		282.6	959.1	2543.5	3980.8	1845.9	1740.2	605.6	1126.5
BAL06	26	40G8	used	60182	23.8	6031.7	3421.4	11862.6	24141.6	6151.0	5012.0	1762.8	1807.6

Table 3.1.11. Rectangles covered by two countries and results from each country for estimated sprat biomass.

VESSEL	SD	RECT	USED OR NOT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
BAL06	24	38G4	not used	364	194.5	52.7	23.6	75.6	12.3	3.3			
SOL06	24	38G4	used	10761	4500.2	2144.6	1148.6	2141.2	610.5	156.7	57.3		
ATL06	26	38G9	used	55970	8047.1	16721.2	2925.8	21465.7	4863.1	1105.2	70.3	641.4	130.4
BAL06	26	38G9	not used	31702	701.1	7746.1	2115.8	13980.3	4751.4	1856.8	320.3		76.9
ARG06	25	39G5	used	5361	55.9	1002.4	0.0	3459.8	960.2	244.8	371.7		98.0
BAL06	25	39G5	not used	7491	52.7	525.1	1339.9	2635.6	1328.0	848.7	402.3	248.0	101.0
ATL06	26	39G8	not used	17558	1090.6	5803.3	350.0	5776.1	2777.8	732.0	397.7	345.4	284.6
BAL06	26	39G8	used	21098	583.0	4257.4	1381.4	9189.7	3469.7	1687.4	531.5		37.8
ATL06	26	39G9	used	19753	13.1	2039.3	1108.5	9976.2	4216.8	1278.6	447.7	488.9	184.1
BAL06	26	39G9	not used	26083	926.3	2796.0	1338.5	12480.6	5113.7	2594.2	859.2		
ARG06	25	40G7	used	1465	4.3	231.7	63.3	707.5	112.6	273.9	57.6	143.4	6.0
BAL06	25	40G7	not used	213	0.3	12.2	42.3	79.2	43.6	18.3	9.0	4.7	3.0
ATL06	26	40G8	not used	9840	186.3	2168.3	485.1	4506.5	1609.0	168.9	168.0	345.0	203.1
BAL06	26	40G8	used	61450	1033.8	6413.2	3178.2	30018.5	12349.5	6260.4	2138.2		108.6

Table 3.1.12. 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

Table 3.1.13. 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

Table 3.1.14. Tuning fleet results for herring (25 – 29).

YEAR	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+	TOTAL
2004	5544	14730	7101	4934	2599	1169	638	706	39178
2005	2125	8700	16639	8275	5101	2999	1314	1427	46580
2006	7317	8061	12702	21123	7337	3069	1701	1212	64513

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

In May – June 2006, the following acoustic surveys were conducted:

VESSEL	COUNTRY	ICES SUBDIVISION
WALTHER HERWIG III	Germany	24, 25, parts of 26, 27
ATLANTNIRO	Russia	Parts of 26
BALTICA	Latvia – Poland	Parts of 26 and 28
DARIUS	Lithuania	Parts of 26

Baltic sprat stock density indices of per age groups of the different cruises are stored in the BAD1 database. The cruise reports prepared in the standard format (ICES CM 2002/G:05 Ref. H., Annex 5) are presented in Annex 5 of this report.

3.2.1 Area under investigation and overlapping areas

Each the ICES statistical rectangle of the monitored area was allocated to one country (Anon. 2005), thus each country participate in survey has a mandatory responsible area. That means that area shall be acoustically investigated by about 60 miles and at least two control hauls should be realized in one ICES rectangle. However, it is allowed for all nations to cover also other areas, but the results from the responsible country are used in the final assessment. Two ICES rectangles were investigated by more than one vessel (Figure 3.2.1 and Table 3.2.6)

during the international acoustic survey in May/June 2006. The above-mentioned Figure illustrates the coverage of the Baltic Sea during the BASS surveys in May 2006.

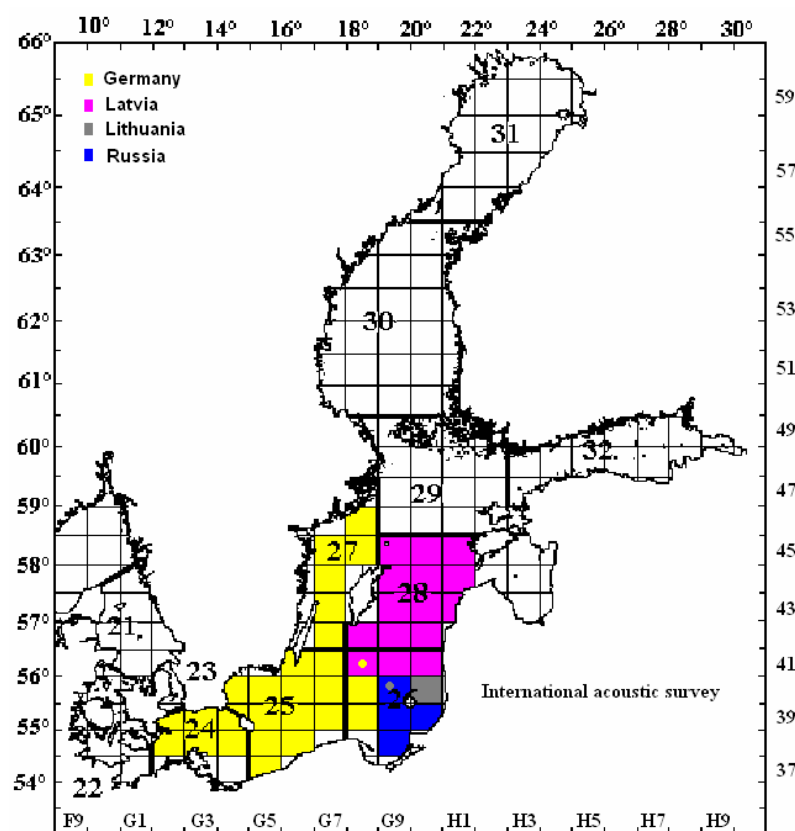


Figure 3.2.1. Map of BASS surveys conducted in May/June 2006. Colours indicate the countries, which covered particular ICES-rectangles and delivered data to BAD1-database, thus was responsible for this rectangle. Coloured dots within a rectangle explain additional data in BAD1-database partly or totally covered by other countries.

3.2.2 Total results

The stock indices, which are based on the international BASS survey in May/June 2006, are summarized in Table 3.2.1. The Baltic stock abundance estimates per ICES Subdivisions and age groups are presented in Table 3.2.2. The corresponding biomass estimates of sprat are given in the Table 3.2.5.

3.2.3 Area corrected data

During the WGBIFS 2006 meeting possible improvement of the results from acoustic surveys was 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 between the total area that should be covered of the ICES Subdivision (see BIAS manual) and the area of rectangles that was covered during the survey. The correction factors, calculated by ICES Subdivisions for 2006 are given in Table 3.2.3. The area corrected abundance estimates for sprat per ICES Subdivision are summarised in Tables 3.2.4.

3.2.4 Recommendation to WGBFAS

WGBIFS during session in March 2007 corrected the Baltic sprat stock density estimated for May 1999–2006 taking into consideration the recent data on the maximum standard area.

WGBIFS recommends that the May/June 1999–2006 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.

3.2.5 Reference

Anon. 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 density of sprat (by numbers x 10⁶) per age groups and the ICES rectangles; May/June 2006.

ICES SD	ICES RECT.	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24	38G2	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
24	38G3	879.0	0.0	233.7	33.6	402.6	143.9	41.0	13.2	11.0	0.0
24	38G4	200.0	0.0	87.0	8.1	76.5	22.2	2.8	1.6	1.9	0.0
24	39G2	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
24	39G3	228.9	0.0	88.3	7.9	92.2	29.5	5.7	3.0	2.4	0.0
24	39G4	74.1	0.0	28.2	2.8	31.2	9.3	1.2	0.7	0.7	0.0
24 total		1382.4	0.0	437.2	52.4	602.8	205.0	50.7	18.4	15.9	0.0
25	37G5	49.2	0.0	2.2	0.6	21.7	12.4	5.2	5.3	0.5	1.3
25	38G5	1224.0	0.0	44.1	14.5	574.7	301.8	124.2	122.0	14.9	27.8
25	38G6	175.9	0.0	4.4	2.3	84.8	44.3	17.0	16.6	2.3	4.2
25	39G4	271.3	0.0	96.2	12.0	119.0	33.0	5.5	3.6	1.2	1.0
25	39G5	2093.9	0.0	281.1	48.3	1186.5	389.3	91.5	57.8	26.8	12.6
25	39G6	3300.3	0.0	144.3	49.4	1768.3	767.6	249.0	222.3	45.3	54.1
25	39G7	3783.8	0.0	455.5	99.4	2163.0	721.7	159.2	101.1	63.5	20.5
25	40G4	665.2	0.0	92.0	15.1	359.4	128.5	33.9	24.1	6.9	5.5
25	40G5	3329.7	0.0	390.8	69.1	1870.2	654.1	155.2	123.3	40.1	26.9
25	40G6	1551.7	0.0	233.2	40.0	853.9	282.7	62.0	49.7	20.5	9.8
25	40G7	263.7	0.0	7.3	3.6	132.4	68.3	20.8	22.7	3.4	5.3
25	41G6	2015.7	0.0	436.7	46.3	1168.0	297.6	42.3	11.6	10.5	2.7
25	41G7	2272.5	0.0	280.6	39.7	1394.4	413.1	85.1	28.6	23.3	7.7
25 total		20996.8	0.0	2468.4	440.2	11696.1	4114.3	1050.8	788.6	259.0	179.4
26	38G8	2707.4	0.0	145.6	90.4	1617.0	722.9	93.6	36.4	1.4	0.0
26	38G9	2642.7	0.0	402.9	277.5	1324.5	537.8	47.7	18.2	34.2	
26	39G8	4149.1	0.0	232.8	131.2	2436.1	1063.8	204.5	77.2	3.6	0.0
26	39G9	7051.1	0.0	723.5	742.2	3982.8	1320.1	176.2	3.4	73.6	29.3
26	39H0	1295.0	0.0	245.7	81.4	671.8	239.5	40.6	6.5	8.9	0.5
26	40G8	2026.3	0.0	75.7	61.7	1242.3	535.8	75.8	33.0	2.1	0.0
26	40G9	6331.4	0.0	1020.5	460.3	3717.7	890.5	132.5	6.3	85.6	17.9
26	40H0	1774.2	0.0	125.9	204.4	593.8	502.6	209.4	46.5	57.2	34.5
26	41G8	10258.9	0.0	667.8	473.7	7021.8	1012.2	644.8	68.3	84.3	285.9
26	41G9	3567.4	0.0	137.3	193.7	1962.5	701.3	264.6	109.4	102.1	96.3
26	41H0	2036.6	0.0	44.6	164.1	1299.0	387.1	80.0	31.4	0.0	30.4
26 total		43840.1	0.0	3822.4	2880.5	25869.3	7913.6	1969.8	436.7	453.0	494.9
27	42G7	4401.3	0.0	222.2	113.6	2590.4	1179.4	210.3	53.5	11.1	20.8
27	43G7	1246.2	0.0	32.6	26.2	742.2	341.4	75.5	17.6	4.3	6.5
27	44G7	4050.3	0.0	495.0	96.1	2184.8	987.6	201.6	49.0	17.2	19.0
27	45G7	5381.8	0.0	1894.1	87.9	2230.6	944.8	176.8	31.3	5.6	10.7
27	45G8	4731.1	0.0	2007.2	88.7	1729.0	738.8	127.0	23.9	8.9	7.5
27	46G8	4103.4	0.0	1283.5	76.9	1743.8	777.8	140.1	50.0	11.8	19.6

Table 3.2.1. Continued.

27 TOTAL		23914.1	0.0	5934.6	489.3	11220.8	4969.6	931.3	225.4	58.9	84.1
28	42G8	10082.0	0.0	301.5	207.6	6769.1	1553.5	380.5	192.7	222.4	454.7
28	42G9	6377.3	0.0	728.5	215.4	3935.6	917.5	367.2	85.4	75.8	51.9
28	42H0	5271.3	0.0	626.5	111.0	3175.2	880.7	359.8	82.2	32.5	3.4
28	43G9	5818.7	0.0	528.0	619.9	3450.6	737.1	326.6	33.3	64.6	58.7
28	43H0	2174.5	0.0	281.2	157.8	1201.2	335.3	141.0	17.8	23.3	16.9
28	44G9	4220.2	0.0	364.7	174.4	2623.4	696.8	219.2	47.8	72.7	21.2
28	44H0	4706.1	0.0	342.4	176.4	3328.2	547.6	159.7	44.7	36.5	70.6
28	44H1	2549.2	0.0	545.4	119.2	1071.7	504.8	154.7	12.7	12.7	128.1
28	45G9	1897.6	0.0	60.0	187.6	1245.6	233.5	63.6	14.0	35.7	57.5
28	45H0	6792.2	0.0	1398.8	810.2	3692.9	586.5	15.8	67.1	93.4	127.3
28	45H1	6046.4	0.0	592.4	1337.5	3288.9	552.7	91.6	0.0	30.5	152.7
28 total		55935.6	0.0	5769.3	4117.1	33782.4	7546.1	2279.7	597.8	700.1	1143.1

Table 3.2.2. Estimated density of sprat (by numbers x 10⁶) per age groups and the ICES Subdivisions; May/June 2006.

ICES SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24 Total	1382	0	437	52	603	205	51	18	16	0
25 Total	20997	0	2468	440	11696	4114	1051	789	259	179
26 Total	43840	0	3822	2880	25869	7914	1970	437	453	495
27 Total	23914	0	5935	489	11221	4970	931	225	59	84
28 Total	55936	0	5769	4117	33782	7546	2280	598	700	1143
Grand total	146069	0	18432	7980	83171	24749	6282	2067	1487	1901

Table 3.2.3. Calculated the correction factor of covered areas for May/June 2006 per ICES Subdivisions.

SD 24	1.27898
SD 25	1.07534
SD 26	1.03451
SD 27	1.38953
SD 28	1.08349

Table 3.2.4. Corrected the Baltic sprat density (in numbers x 10⁶); May/June 2006.

ICES SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24 Total	1768	0	559	67	771	262	65	24	20	0
25 Total	22579	0	2654	473	12577	4424	1130	848	279	193
26 Total	45353	0	3954	2980	26762	8187	2038	452	469	512
27 Total	33229	0	8246	680	15592	6905	1294	313	82	117
28 Total	60606	0	6251	4461	36603	8176	2470	648	759	1239
Grand Total	163534	0	21665	8661	92305	27955	6997	2284	1608	2060

Table 3.2.5. Estimated sprat biomass (in tonnes) of sprat May/June 2006.

SD	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8+
24 Total	22243	0	4328	953	11090	4001	1184	374	313	0
25 Total	236675	0	19933	4288	129402	50244	14676	12201	3107	2824
26 Total	386336	0	20206	22933	224318	79781	22063	5230	5609	6196
27 Total	224658	0	33394	4859	114415	54449	11371	3694	1047	1429
28 Total	448761	0	24253	27998	270741	72074	24288	6931	8306	14170
Grand Total	1318673	0	102114	61031	749966	260550	73582	28430	18381	24618

Table 3.2.6. Rectangles covered by two countries and results from each country for estimated sprat biomass

VESSEL	SD	RECT	TOTAL	AGE 0	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE8+
ATLD06*	26	40G9	6331	0	1021	460	3718	890	133	6	86	18
DAR06	26	40G9	3651	0	182	152	1878	579	290	141	213	215
BAL06**	26	41G8	10259	0	668	474	7022	1012	645	68	84	286
WAH06	26	41G8	2465	0	168	72	1553	576	65	29	1	0

*) Russia was responsible for acoustic investigations in the ICES rectangle 40G9, however also Lithuania taken part in the May 2006 BASS survey,

**) Latvia was responsible for acoustic investigations in the ICES rectangle 41G8 and the May 2006 BASS survey was realized jointly by the Latvia and Poland on the RV "Baltica".

Table 3.2.7. Corrected density (in 10⁶ indiv.) of the Baltic sprat stock resulted from the May 1999–2006 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

4 Update of the hydro-acoustic database BAD1 and BAD2 for the years 1991 to 2006

4.1 Validation of BAD 1

Cross checks of BAD1 data have shown some incorrect datasets. Following checks were used:

- Comparison of the used surface area of the rectangles in BAD 1 with the area in the BIAS manual (area deeper than 10 meters). In some cases only parts of the total area were stored in BAD1 because the country covered only part of the rectangle
- Check whether the proportion of herring and sprat are less or equal than 100%
- Check the conformity of the total index with the sum of stock indices by age groups
- Calculation of the total stock size from available parameters (area, s_A , σ) in table ST and comparison with the total numbers and the corresponding fractions for herring and sprat.

For all available data these checks were realized and suspicious datasets were marked. The BAD1 database with the marks was submitted to the participants in August 2006 for evaluation and correction. Unfortunately, the verification of the data is not finished until now by some countries. Therefore, the reworked database is not available for the used by WGBFAS yet.

The procedure for estimating stock indices of herring and sprat based on the acoustic data was discussed. The results of the acoustic surveys by rectangles were evaluated during the meetings of the planning groups and WGBIFS and it was defined how data should be handled in cases where two or more vessels worked in the same rectangle with different intensity.

Following options were used:

- The “best” value was used depending on acoustic coverage and number of fishery stations
- A combination (mean, sum of fractions) of the different results were used

These agreements were presented in the reports, but, the information was not stored in BAD1. Therefore, it was difficult to use the BAD1 database to recalculate the stock indices. To improve the usability of BAD1 flag will be added to the database for each dataset which describe the agreed use of the datasets.

The flags make it possible to establish routine tools for estimating stock indices without special knowledge of the different acoustic surveys.

Following flags should be applied

- | | |
|-----|--|
| 0 | dataset is not used for estimating the stock index due to low coverage |
| 0.5 | two datasets exist for the rectangle; the arithmetic mean of both dataset is used for estimating stock indices |
| 1 | only one dataset exist for the rectangle and dataset is used for estimating the stock indices |

The use of the flags has the consequences that for all datasets the total area of the rectangle as defined in the BIAS manual must be stored in the database instead of the area covered during the survey.

The second problem in relation to the estimation of stock indices from BAD1 was the different coverage of the ICES subdivision from year to year. The number of covered rectangles in an ICES subdivision varies from year to year due to weather conditions, vessel capacities etc. Therefore the sum of existing fish numbers in the ICES subdivisions can not be used as stock index. Instead, following procedure is proposed for estimating stock indices. The mean fish density ρ_A of the ICES subdivision will be estimated based on the data of the covered rectangles by

$$\rho_A = \frac{\sum F_i I_i}{\sum A_i F_i}$$

where A_i is the area of rectangle i and I_i is the stock index of the same rectangle. F_i denotes the flag of the dataset. The mean stock index is then multiplied with the total area of the subdivision, A , to get the total stock index, I .

$$I = A\rho_A$$

Status of reworking of BAD1

Country	Status
Estonia	Corrected
Finland	Corrected
Germany	Corrected
Latvia	
Lithuania	
Poland	Corrected
Russia	
Sweden	2000–2005

Although the reworking of the BAD1 database is not finished yet it was agreed that the current version will be made available for the assessment working group combined with the information that this is a preliminary reworked version. After correction of all data the final version will be made available for all countries and the WGBFAS.

The estimation of the uncertainty (variance, coefficient of variations, confidence intervals) for the stock indices as it was recommended by WGBFAS 2006 is not possible based on the aggregated data which are stored in BAD1 (stock indices by rectangles). First studies related to this topic were realized by Russia using all source data of the surveys which were realized in 2005. Additional studies are possible when all source data are stored in BAD2 version of FishFrame. To speed up the studies it is proposed that the source data of the acoustic surveys in 2004 and 2006 are submitted to Russia (Svetlana Kasatkina and Pavel Gasyukoy) in the old BAD 2 and the BAD2 FishFrame format until July 2007.

BAD2/Fishframe

In former times the raw data of the acoustic surveys in October were stored in the database BAD2 at the DIFRES. Since 2006 this database is no longer continued. All collected data were transferred into the Fishframe Acoustic. During this transfer it came obviously to errors. It is thus necessary to examine all data records in Fishframe Acoustic. For this purpose a download of these data is to be ensured in the prescribed exchange format. This function is not yet implemented in the data.

The future and the improvement of the database in the Fishframe system were discussed during a workshop in June 2006 in Copenhagen. This workshop was initiated by the PGHERS at short notice. The participation of members from the WGBIFS was therefore very modest.

The WGBIFS discussed the results of the Workshops in detail. In principle the new exchange format was found as useful. This format represents a simplification compared to the previous format. Some ambiguities were eliminated. There were however also critical arguments which were partial of fundamental nature or resulted from the specific practice of acoustic surveys in the Baltic Sea. These critical arguments were collected and transmitted to the designer of the database Teunis Jansen (DIFRES). Most open problems could be clarified still during the meeting, but, the discussions of some problems were continued after the meeting by mail.

A further question is the treatment of the aggregated data which are stored in BAD1 until now. This database contains stock indices and mean weight at age of herring and sprat by age group, rectangle and survey (see above), but the data are not stored in an on-line database. Special tables for the storage of aggregated data are available in Fishframe Acoustic. They were used for the storage of the results of the acoustic herring survey in the North Sea. The structure of these tables is strongly different to the BAD1 format. However it is possible to convert the BAD1 data into the new structure. This conversion will be accomplished by Rainer Oeberst (Germany). Missing information (middle lengths) could remain empty for the time being. On the other hand it is recommended to include additional information from the BAD1 content (sA- values, scattering cross sections) in additional new table in Fishframe Acoustic.

5 Plan and decide on acoustic surveys and experiments to be conducted in 2007 and 2008

5.1 Planned acoustic survey activities

All the Baltic Sea countries intend to take part in acoustic surveys and experiments in 2007. 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)	03.–24.05.	22
BALTICA	Latvia, Poland	26 (part), 28	15.–24.05.	10
DARIUS	Lithuania	26 (Lithuanian EEZ)	May	2
ATLANTIDA	Russia	26(part)	May	10
BALTICA	Poland	24(N), 25, 26	15.09. – 4.10.	21
ARGOS	Sweden	25(N), 27, 28 (W), 29 (W), 30	01.–31.10.	31
SOLEA	Germany, Denmark	21, 22, 23, 24	04.–23.10.	20
BALTICA	Latvia, Poland	26(N), 28	09.–18.10.	10
BALTICA	Estonia, Finland, Poland	28(part), 29 (N), 32(W)	20.–31.10	12
ATLANTNIRO/ ATLANTIDA	Russia	26	October	15
DARIUS	Lithuania	26 (Lithuanian EEZ)	October	2
CHARTER	Latvia, Estonia	28 (Gulf of Riga)	26.07.–02.08.	8

The preliminary plan for acoustic surveys and experiments in 2008 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	10
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	21
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	19
ARGOS	Sweden, Finland	30, 31 (part)*	September-October	12
SOLEA	Germany/Denmark	21, 22, 23, 24	October	20
DARIUS	Lithuania	26 (Lithuanian EEZ)	October	2
ATLANTIDA/ ATLANTNIRO	Russia	26	October	15
CHARTER	Latvia, Estonia	28 (Gulf of Riga)	July	8

* - Part of Subdivision 31 will be covered if additional funding will be available and the weather conditions are not limiting the number of survey working days.

5.2 An extended acoustic survey in the Gulf of Bothnia

In 2006, the WGBFAS has pointed out the need for an acoustic survey in SD 30 and 31 to get independent indices of stock size of pelagic species. WGBFAS has recommended the organisation of an annual fish survey by the WGBIFS in the Gulf of Bothnia from 2007 onwards.

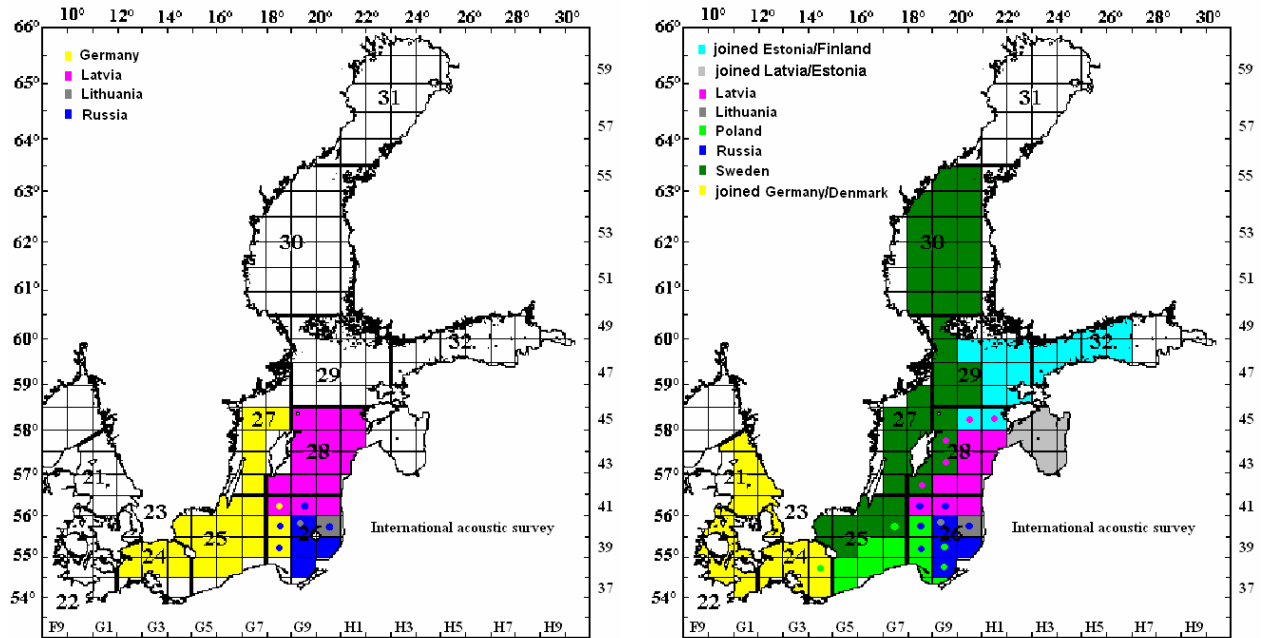
According to this recommendation Sweden is planning to prolong their acoustic survey up to the SD 30 in the autumn 2007. Furthermore, Sweden and Finland are planning a joint acoustic survey in SD 30 to be started in the autumn of 2008. This joint survey will cover also the part of SD 31 if additional funding will be available and the weather conditions are not limiting the number of survey working days. 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.

5.3 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 2007 and 2008.

The planned coverage of the Baltic Sea and the assignment of the national/joint acoustic surveys to the rectangles in 2007 are presented in Figure 5.3.1 and 5.3.2. The planned coverage of the Baltic Sea and the assignment of national/joint surveys to the rectangles during the acoustic surveys in 2008 are presented in Figure 5.3.3 and 5.3.4.



Figures 5.3.1–5.3.2. 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 2007 (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).

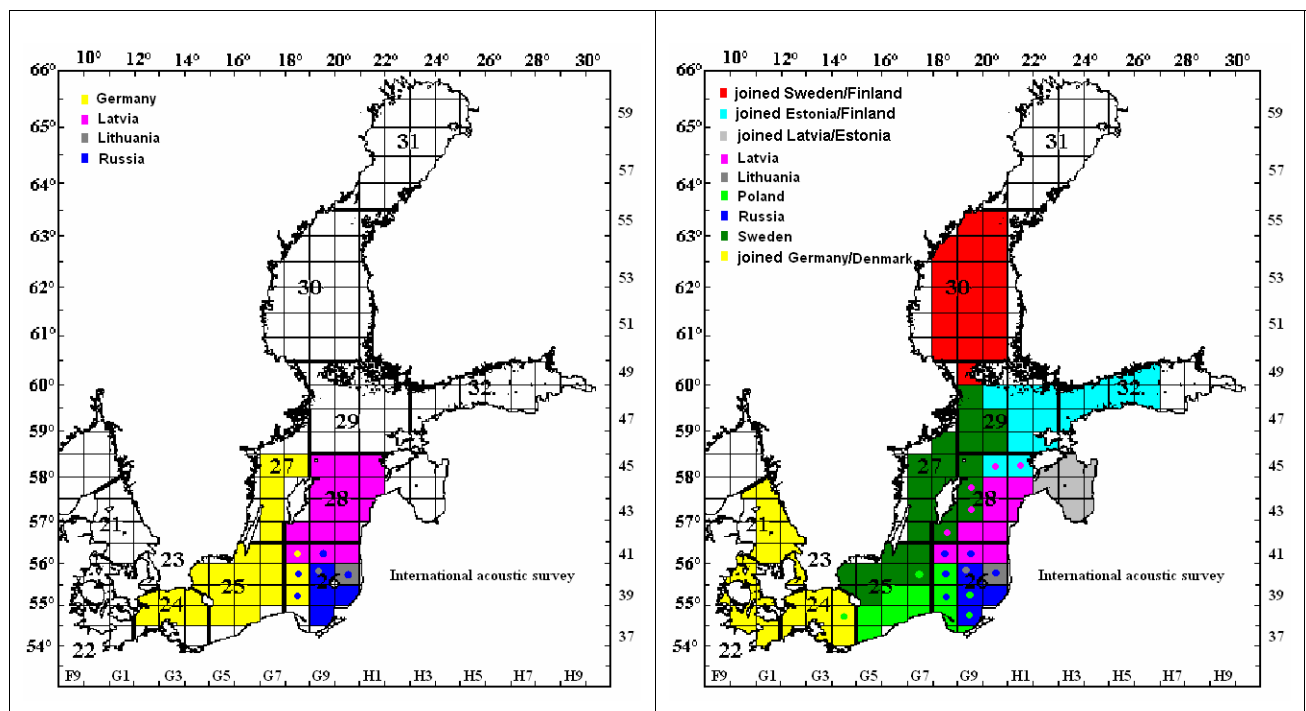


Figure 5.3.3–5.3.4. Proposed preliminary assignment of the national/joint surveys to rectangles in May and October in 2008 (from left to right). Base colours of rectangles indicate the country or joint survey, which is responsible for this ICES-rectangle. Coloured dots indicate overlapping coverage by other countries (sometime only parts of rectangle are covered).

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

Following table defines these rectangles for the May survey in 2007 and 2008:

COUNTRY	RECTANGLE	MANDATORY/OPTIONAL
Russia	39G8, 40G8, 41G9	mandatory
Russia	40H0, 41G8	optional

Following table defines these rectangles for the October survey in 2007 and 2008:

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 2007 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 coordinator (**Niklas Larson**, niklas.larson@fiskeriverket.se) and the BAD1 manager (**Eberhard Götze**, eberhard.goetze@ifh.bfa-fisch.de) not later than one month before the ICES WGBIFS meeting of the next year. These results are intended for the information of the ICES Assessment Working Groups.

6 Discuss the results from the bits surveys performed in autumn 2006 and spring 2007

6.1 Discussion of new surveys conducted in the Kattegat

Design and results of two surveys which are carried out in the Kattegat and partly Skagerrak were presented and discussed during the meeting.

Jørgensen. 2007. Outline of joint fisheries research/fishing industry survey for sole in Skagerrak and Kattegat. Working document WGBIFS in Rostock, Germany, 26–30 March 2007, 7pp.

Svedäng. 2007. The Ancyclus survey – an opportunity to enlarge fishery independent information to the Kattegat cod assessment. Working document WGBIFS in Rostock, Germany, 26–30 March 2007, 26pp.

Survey of Sole in the Kattegat/Skagerrak

Since 2004 Denmark has annually conducted a bottom trawl survey aimed at sole in Kattegat and Skagerrak (Jørgensen. 2007). The purpose of the survey series is to establish a time series of catch and effort data independent of the commercial fishery, based on fishing on 120 fixed stations, in order to strengthen the scientific advice on the sole stock in ICES Division IIIa. The survey takes place during night-time and has a very high catch rate of sole compared to other surveys conducted in the area.

The design and results of the surveys was discussed by the group as well as further analyses concerning the stratification, used for biomass and abundance estimation, and studies related to other species which are recorded during the survey. The group agreed that the survey can produce indices which can support the assessment of the sole stock in the Kattegat/Skagerrak which is assessed in WGBFAS. The WGBIFS further agreed to undertake coordinating and quality control of the survey in the future.

Survey of cod in the Swedish zone of the Kattegat

There is increasing uncertainty in collected landing statistics on the Kattegat cod, which limits the value of present stock assessment work. In addition, the fact that the Kattegat cod is in a severely depleted state, lays stress on the need for additional fishery independent data. Swedish coastal trawl surveys have been carried out by RV “Ancyclus” since 2002 in the second and fourth quarter of the year in the Kattegat. In spite of the short duration of the time series, the proposed surveys “Ancyclus” Q2 and “Ancyclus” Q4 showed satisfactory results concerning the internal consistency and correlation with other indices and in different XSA exploratory runs. BIFS therefore concluded that “Ancyclus” Q2 and “Ancyclus” Q4 could be considered as well fitted for the use as tuning fleets for the assessment of Kattegat cod, and recommended the use of these surveys either as one additional survey or in combination with other, already existing tuning fleets in the area. The survey is related to cod and flounder in the Kattegat and covers Swedish zone of the area and some stations are located in shallow water which is not covered by the IBTS surveys. Therefore, the group proposed that it should be evaluated whether the survey can be established as part of the existing surveys to improve the existing time series. An alternative option is that the survey will be coordinate by WGBIFS.

The extension of the area covered by WGBIFS by inclusion of the Swedish “Ancyclus Survey” (see Annex 4, Working document: The “Ancyclus” survey – an opportunity to enlarge fishery independent information to the Kattegat cod assessment) and the Danish Sole survey (see Annex 4, Working document: Outline of joint fisheries research/fishing industry survey for sole in Skagerrak and Kattegat) into the coordination of the WGBIFS was discussed by the WG. Kattegat has up till now not been included in the working area of WGBITS. Therefore,

Empty cells indicate that no BITS data were submitted to ICES because no survey was conducted. All countries which still have not carried out the outlier checks for cod data are urged to do the check on cod data before mid June in order to be able to include all relevant data in internationally combined analysis on maturity.

Table 6.2. Overview of the reworking of flounder and additional flatfish data of BITS in quarter 1 and 4 which are stored in the DATRAS database

COUNTRY	DEN		EST		GER		LAT		LIT		POL		RUS		SWE	
Quarter	1	4	1	4	1	4	1	4	1	4	1	4	1	4	1	4
1991	N				C	C	C									
1992	N				C	C	C						C			
1993	N				C	C	C						C			
1994	N				C	C	C				N		C			
1995	N				C	C	C				N		C			
1996	N				C	C	C				N		C			
1997	N				C	C	C				N		C			
1998	N				C	C	C				N		C			
1999	N	N			C	C	C	C			N		C			
2000	N	N			C	C	C	C			N		C			
2001	N	N			C	C	C	C			N		C			
2002	N	N			C	C	C	C			N	N	C			
2003	N	N			C	C	C	C			N	N	C	C		
2004	N	N			C	C	C	C		N	N	N	C	C		
2005	N	N		C	C	C	C	C	N	N	N	N	C	C		
2006	N	N		C	C	C	C	C	N	N	N	N	C	C		
C	corrected.															
N	correction not finalized.															

Sweden has sample flounder CA data during some cruises, but, not regularly.

Furthermore, it has been discovered that some data have been uploaded to DATRAS without individual weights in the CA-record. Most of these data have in cases where weight information exists now been re-submitted to ICES including the weight information and uploaded to DATRAS. Countries which still have data to resubmit are urged to do the corrections.

Table 6.3. Data of flounder which are available in DATRAS February 2007.

Survey	Country	Number of				Ageing	Weighting
		HL records	individuals meas.	CA records	individuals analysed		
Q1 2001	Denmark (Dana)	987	6289	783	811	N	Y
	Hafisken	431	2033	0	0		
	Estonia						
	Germany	641	2848	517	547	Y	Y
	Latvia	655	37817	155	185		
	Lithuania						
	Poland	707	17150	129	129	Y	Y
	Russia	821	42554	1248	2571	Y	N
	Sweden	545	29133	0	0		
Q1 2002	Denmark (Dana)	747	8848	0	0		
	Hafisken	382	2263	0	0		
	Estonia						
	Germany	747	7508	892	925	Y	Y
	Latvia	477	27421	0	0		
	Lithuania						
	Poland	274	5029	95	118	Y	Y
	Russia	736	52253	1418	1555	Y	Y
	Sweden	643	10813	0	0		
Q1 2003	Denmark (Dana)	734	7920	0	0		
	Hafisken						
	Estonia						
	Germany	590	3820	524	540	Y	Y
	Latvia	355	15966	0	0		
	Lithuania						
	Poland	497	24079	240	242	Y	Y
	Russia	744	25370	1569	1860	Y	Y
	Sweden	544	11144	0	0		
Q1 2004	Denmark (Dana)	499	7218	0	0		
	Hafisken						
	Estonia						
	Germany	505	3458	433	467	Y	Y
	Latvia	724	19907	124	125	Y	Y
	Lithuania						
	Poland	489	10274	196	199	Y	Y
	Russia	552	14608	1555	1762	Y	Y
	Sweden	537	6973	0	0		
Q1 2005	Denmark (Dana)	764	19589	0	0		
	Hafisken						
	Estonia						
	Germany	608	1811	541	554	Y	Y
	Latvia	497	18252	154	155	Y	Y
	Lithuania	40	166	84	84	Y	Y
	Poland	548	15793	206	209	Y	Y
	Russia	537	8093	1199	1388	Y	Y
	Sweden	651	10639	0	0		
Q1 2006	Denmark (Dana)	509	10933	250	250	N	Y
	Hafisken						
	Estonia						
	Germany	660	2829	509	519	Y	Y
	Latvia	457	14902	266	274	Y	Y
	Lithuania	47	90	88	90	Y	Y
	Poland	551	37666	278	282	Y	Y
	Russia	185	1704	383	418	Y	Y
	Sweden	618	13752	0	0		
Q4 2001	Denmark (Dana)	146	1530	0	0		
	Hafisken	131	574	0	0		
	Estonia						
	Germany	499	2961	639	653	Y	Y
	Latvia	485	52684	0	0		
	Lithuania						
	Poland						
	Russia						
	Sweden	183	6132	0	0		
Q4 2002	Denmark (Dana)	309	1502	0	0		
	Hafisken	179	1296	0	0		
	Estonia						
	Germany	693	7662	603	627	Y	Y
	Latvia	400	30088	0	0		
	Lithuania						
	Poland	336	30106	131	132	Y	Y
	Russia						
	Sweden	386	7820	0	0		
Q4 2003	Denmark (Dana)	97	143	0	0		
	Hafisken						
	Estonia						
	Germany	4505	3214	494	508	Y	Y
	Latvia	204	12995	0	0		
	Lithuania						
	Poland	297	3814	168	176	Y	Y
	Russia	48	162	78	81	Y	Y
	Sweden	161	2243	0	0		
Q4 2004	Denmark (Dana)	142	228	0	0		
	Hafisken						
	Estonia						
	Germany	539	2240	526	538	Y	Y
	Latvia	177	22578	0	0		
	Lithuania	55	4004	126	127	Y	Y
	Poland	356	13376	187	187	Y	Y
	Russia	16	34	13	13	Y	Y
	Sweden	176	4589	0	0		
Q4 2005	Denmark (Dana)	42	59	0	0		
	Hafisken						
	Estonia	133	1378	309	322	Y	Y
	Germany	409	1397	508	514	Y	Y
	Latvia	395	54115	111	113	Y	Y
	Lithuania	42	60	60	60	Y	Y
	Poland	358	8528	224	225	Y	Y
	Russia	297	7340				
	Sweden						
Q4 2006	Denmark (Dana)	96	171	0	0		
	Hafisken						
	Estonia						
	Germany	558	3360	558	566	Y	Y
	Latvia						
	Lithuania	49	175	170	173	Y	Y
	Poland	191	2119	145	145	Y	Y
	Russia	127	3346	0	0		
	Sweden						

The table illustrates that the quantity of CA data of flounder is significantly lower than for cod. Estimated stock indices based on the available age data are biased because CA data are not available from large areas of the ICES subdivisions. Therefore, **WGBIFS recommended that the same quantity of sampled data for flounders like length, age, sex, maturity, weight is required as for cod (see BITS Manual).**

6.3 Summary of 4th quarter surveys in 2006

The following tables summarize the national parts of the BITS in autumn 2007 by countries. Cruise reports with more detailed descriptions of the surveys are presented in Annex 7.

NATION:	DENMARK	VESSEL:	"DANA II"
Survey:		Dates:	

Cruise	
Gear details:	The large (930) standard TV3 trawl is used. Following the recommendations in the TOW database stations are fished either with or without rock-hoppers. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were encountered during the survey. Acoustic logging was performed as routine during all hauls and in connection with assumed zero-catch hauls.

ICES SUB- DIVISIONS	GEAR (TVL,T VS)	DEPTH STRATA (1-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALIZED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALIZED USING ROCK HOPPERS	NUMBER OF ASSUMED ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATION S FISHED
25	TVL	2	2	2			1	1	100
25	TVL	3	9	6		2	1	2	100
25	TVL	4	21	12		5	1	1	
25	TVL	5	10	1	OLD	9			100
26	TVL	4	5	4		1			100
26	TVL	5	3	3					100
26	TVL	6	1	1					100

NATION:	DENMARK	VESSEL:	“HAVFISKEN”
Survey:		Dates:	16–31 October 2006

Cruise	
Gear details:	The small (#520) standard TV3 trawl is used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were encountered during the survey.

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING “STANDARD” GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK- HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
22	TVS	0	3	3	0	0	0	0	
22	TVS	1	4	4					
22	TVS	2	2	2					
22	TVS	3	1	1					
23	TVS	0	2	2					
21	TVS	0	9	9					
21	TVS	1	9	9					
21	TVS	2	6	6					
21		3	2	2					

NATION:	GERMANY	VESSEL:	“SOLEA”
Survey:	Autumn 2006	Dates:	30 October – 17 November 2006

Cruise	
Gear details:	Small version of the TV3 trawl was used. Rockhopper equipment was not used according to the recommendation of WGBIFS.
Notes from survey (e.g. problems, additional work etc.):	Information related to the realized hauls was made available for reworking the tow database. Oxygen content did not influence the distribution of cod and flatfish.
Additional comments:	

ICES SUBDIVISIONS (TVL,TVS)	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED		NUMBER OF VALID HAULS REALISED USING ROCK- HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
				OF “STANDARD” GROUND GEAR	USING “STANDARD” HAULS					
22	TVS	1 – 2	13	13						100
24	TVS	1 – 3	47	42						89

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>	3009		
<i>Gadus morhua</i>	1009		
<i>Platichthys flesus</i>	566		
<i>Pleuronectes platessa</i>	360		
<i>Psetta maxima</i>	127		
<i>Sprattus sprattus</i>	3888		

NATION:	LATVIA	VESSEL:	POLAND RV "BALTICA"
Survey:	2	Dates:	2–11 December 2006

Cruise	
Gear details:	The large standard TV3 trawl with rockhoppers was used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	In the time of survey 1 trawl was destroyed. Information about this trawl is included in database.
Additional comments:	

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF "STANDARD" HAULS USING GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVS	2–6	25 (for		15	4	0	1	
28	TVS	1–4	survey)		11	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>			
<i>Gadus morhua</i>	722		
<i>Pleuronectes platessa</i>	276		
<i>Solea solea</i>			

NATION:	LITHUANIA	VESSEL:	"DARIUS"
Survey:	IVQ	Dates:	27 November – 10 December 2006

Cruise	
Gear details:	The small (#520) standard TV3 trawl was used. No rockhoppers was used.
Notes from survey (e.g. problems, additional work etc.):	Due to bad weather survey was split into two one day cruises (27/11 and 10/12). One station was impossible to realize, because of bad weather and extreme distance from other tows. Acoustic logging was performed only in December part of survey. No zero-catch hauls were encountered. Total 7 hauls were performed out of 8. No additional stations.
Additional comments:	All bycatch species was recorded and will be submitted to DATRAS

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVS	1	1	1	0	0	0	0	0	100
26	TVS	2	2	2	0	0	0	0	0	100
26	TVS	3	4	3	0	0	0	0	0	75
26	TVS	4	1	1	0	0	0	0	0	100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>	240		
<i>Gadus morhua</i>	331		
<i>Platyctys flesus</i>	170		

NATION:	POLAND	VESSEL:	“BALTICA”
Survey:	18/2006/MIR	Dates:	14–23 November 2006

Cruise	BITS Q4 - 2006
Gear details:	Trawling was done with the standard rigging ground trawl type TV-3#930 (large version of trawl without bobbins and additional chains connected with footrope), with 10 mm mesh bar length in the cod end. A standard vertical sounder monitored the trawling depth. Usually a 5÷7 m vertical net opening was achieved.
Notes from survey (e.g. problems, additional work etc.):	The pre-selected hauls location and the mean depths of catch stations were verified and slightly modified before the RV “Baltica” survey. The finally selected positions and the mean depths were suitable for all hauls realized by the Polish vessel with the exception of haul N° 26132. Due to totally damaged net on the above-mentioned haul position it should be deleted from the TD list. Moreover, due to serious vessel technical problem occurred during the realisation of above-mentioned haul, the vessel was not capable of finalize the survey. Location of other, additional haul N° 25 (at start position of 55°10.0'N, 16°52.9'E) made in the Slupsk Furrow should be treated as non-representative for bottom fishing – the net was partly damaged. Realization of hauls N° 26167 and 26038 was blocked by the navy additional regulations. From totally conducted 30 hauls (27 hauls was planed), 28 can be accepted as fully representative. From planed 13 working days, the 10 days were utilized for fulfilling the survey purposes. A very strong wind, which appeared on 21.11.2006, stopped the fish catches realization for few hours.
Additional comments:	At each hauling position, a CTD profile was taken. Six additional hauls location were applied, but one above-mentioned geographical position (haul N° 25) cannot be incorporated in the TD database. Seven experimental hauls planed with the herring pelagic trawl in the nearby bottom zone in the deep pre-selected areas were not conducted, because during survey the oxygen deficit was not registered in the bottom zone.

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1-6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK- HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
25	TVL	-9	0	0	0	0	0	0	
		8	3	3	0	0	0	0	
		9	6	7	0	0	0	0	
		10	4	4	0	0	0	1	
		11	4	8	0	0	0	0	
		12	1	1	0	0	0	0	
		13	0	0	0	0	0	0	
		14	0	0	0	0	0	0	
26	TVL	-9	0	0	0	1	0	0	
		8	0	0	0	0	0	0	
		9	2	1	0	0	0	0	
		10	1	0	0	0	0	1	
		11	3	1	0	0	0	0	
		12	2	3	0	0	0	0	
		13	1	0	0	0	0	0	
		14	0	0	0	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):

SPECIES	LENGTH	AGE
<i>Clupea harengus</i>	4659	508
<i>Gadus morhua</i>	7981	494
<i>Pleuronectes platessa</i>	407	89
<i>Platichthys flesus</i>	1091	159
<i>Psetta maxima</i>	27	27
<i>Sprattus sprattus</i>	2790	244

NATION:	RUSSIA	VESSEL:	“ATLANTNIRO”
Survey:	51	Dates:	23 October – 30 October 2006

Cruise	
Gear details:	The large standard TV3 trawl is used. Following the recommendations in the TOW database stations are fished either without rockhoppers. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were experienced during the survey. Three subsidiary trawling have been made. Experimental works on vertical distribution of cod in midwater has been executed. Damage of a trawl on trawling station 26108 from Tow Database. The trawling station 26151 is executed instead of trawling station 26108.
Additional comments:	It is necessary to exclude trawling station 26108 from Tow Database.

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF “STANDARD” HAULS USING GROUND GEAR	NUMBER OF VALID HAULS REALISED	NUMBER OF VALID ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVL	1 (20–39m)	2	2	0	0	0	0	
26	TVL	2 (40–59m)	0	1	0	0	0	0	
26	TVL	3 (60–79m)	1	3	0	0	0	0	
26	TVL	4 (80–99m)	6	6	0	0	1	1	
26	TVL	5 (>100m)	2	2	0	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>	2115		
<i>Gadus morhua</i>	862		
<i>Platichthys flesus</i>	156		
<i>Solea solea</i>			
<i>Sprattus sprattus</i>	1690		

NATION:	SWEDEN	VESSEL:	"RV ARGOS"
Survey:	Autumn 2006	Dates:	20–30 November 2006

Cruise	
Gear details:	Sweden uses the standard TV-3#930 trawl. No tows are done with the rockhopper ground gear on harder ground stations. The trawl construction is according to the specifications in the BIFS manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were experienced during the survey. 2 stations assigned to Denmark were trawled closed to the Swedish coast (SD 25). Acoustic logging was performed continuously during the all expedition. 9 pelagic trawls (Fotö 3.2) were executed in SD 25 in coincidence of oxygen deficiency (<1ml/l) at bottom (pilot project to investigate the potential pelagic distribution of cod in situations of low oxygen conditions at the bottom).

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK- HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
25	TV3L	2	2	2					100
		4	1	1					100
25	FOT		9	9					100
26	TV3L	2							100
		3							100
		4							100
		5							100
		6							100
27	TV3L	3	2	2					100
		4	5	5		2			100
		5	1	1		1			100
		6	2	2		2			100
28	TV3L	3	1	1					100
		4	5	5		1	1		100
		5	4	4		4			100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	AGE	LENGTH
<i>Gadus morhua</i>	678 (TV3L), 155 (FOT)	4129
<i>Clupea harengus</i>		4191
<i>Sprattus sprattus</i>		4483
<i>Platichthys flesus</i>		804

Conclusion concerning the use of the results from the BITS 4th quarter

The planned and realized coverage of the Baltic Sea corresponded well during the trawl survey in November 2006. Only low number of hauls was not realized in the deepest parts of the basins due to oxygen depletion. Zero catches were assumed in these regions and datasets with validity code “N” were added to the DATRAS database when it was shown before by at least two hauls that catch was really zero at station with oxygen content of smaller than 1.5 ml/l. Following table summarizes the total numbers of realized station by ICES Subdivision.

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 2006 can be used without any restrictions by the WGBFAS.

6.4 Summary of 1st quarter surveys in 2007

The following tables summarize the national parts of the BITS in autumn 2007 by countries. Cruise reports with more detailed descriptions of the surveys are presented in Annex 7.

NATION:	DENMARK	VESSEL:	“HAVFISKEN”
Survey:		Dates:	5–27 March 2007

Cruise	
Gear details:	The small (#520) standard TV3 trawl is used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were encountered during the survey.

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING “STANDARD” GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% OF STATIONS FISHED
22	TVS	2 – 3	12	11	0	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>			
<i>Gadus morhua</i>			
<i>Pleuronectes platessa</i>			
<i>Solea solea</i>			

NATION:	GERMANY	VESSEL:	“SOLEA”
Survey:	Spring 2007	Dates:	14 February – 5 March 2007

Cruise	
Gear details:	Small version of the TV3 trawl was used. Rockhopper equipment was not used.
Notes from survey (e.g. problems, additional work etc.):	Information related to the realized hauls was made available for reworking the tow database. Oxygen content did not influence the distribution of cod and flatfish.
Additional comments:	

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF “STANDARD” HAULS REALISED USING GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ASSUMED ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
22	TVS	1–2	11	11	0	0	0	0	100
24	TVS	1–3	46	44	0	0	0	0	96

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
<i>Clupea harengus</i>	4842		
<i>Gadus morhua</i>	1579		
<i>Platichthys flesus</i>	520		
<i>Pleuronectes platessa</i>	368		
<i>Psetta maxima</i>	167		
<i>Sprattus sprattus</i>	6616		

NATION:	LATVIA	VESSEL:	Rv "BALTICA"
Survey:	1	Dates:	3–12 March 2007

Cruise	
Gear details:	The large standard TV3 trawl with rockhoppers was used. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	In the time of survey 1 trawl was destroyed. Some changes in survey design were made due to problems with ice in northern part in SD 28. Additional track were made in SD 26 and 28.
Additional comments:	

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED		NUMBER OF HAULS REALISED USING ROCK- HOPPERS	NUMBER OF VALID ASSUMED ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
				USING "STANDARD" GROUND GEAR	USING ROCK- HOPPERS					
26	TVL	2–3,5	25 (for	0	5	1	0			
28	TVL	1–4	survey)	0	26	4	0	1		

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
Species	Age	Species	Age
<i>Clupea harengus</i>			
<i>Gadus morhua</i>	864		
<i>Pleuronectes platessa</i>	302		
<i>Solea solea</i>			

NATION:	LITHUANIA	VESSEL:	"DARIUS"
Survey:	IQ	Dates:	8–9 March 2007

Cruise	
Gear details:	The small (#520) standard TV3 trawl was used. No rockhoppers was used.
Notes from survey (e.g. problems, additional work etc.):	Acoustic logging was performed during all survey. No zero-catch hauls were encountered. Total 8 hauls were performed out of 8. No additional stations.
Additional comments:	All bycatch species was recorded and will be submitted to DATRAS

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
26	TVS	1	1	1	0	0	0	0	100
26	TVS	2	2	2	0	0	0	0	100
26	TVS	3	5	3	0	0	0	0	100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):

Species	Age	Species	Age
Data not ready			

NATION:	POLAND	VESSEL:	“BALTICA”
Survey:	2/2007/MIR	Dates:	12–27 February 2007

CRUISE	BITS Q1 - 2007
Gear details:	Trawling was done with the standard rigging ground trawl type TV-3#930 (large version of trawl without bobbins and additional chains connected with footrope), with 10 mm mesh bar length in the codend. A standard vertical sounder monitored the trawling depth. Usually a 5÷7 m vertical net opening was achieved.
Notes from survey (e.g. problems, additional work etc.):	<p>According to the BIFSWG plans on February/March 2007, the Polish vessel was obliged to cover with 38 randomly selected bottom control hauls parts of the ICES SDs 25 (27 planned hauls) and 26 (11 planned hauls) – within the Polish EEZ. The RV “Baltica” realized 37 assigned bottom catch stations and five additional hauls primary not selected.</p> <p>The pre-selected by the WGBIFS hauls location and the mean depths of catch stations were verified and slightly modified before the RV “Baltica” survey. Despite this fact, in the case of hauls N° 26086, 26186 and 26177 the final trawling depth was modified. In the most of hauls, the finally selected trawling position and the mean depth were suitable for fish stations realization. Location of two other control catches, marked with the numbers 25025 and 25013, can be treated as non-representative for bottom fishing – the net was partly damaged, and due to this fact the above-mentioned hauls position should be deleted from the TD list. From totally of 42 realized hauls (16 hauls were located in the Gdansk Basin and 26 hauls in the Bornholm Basin) 40 can be accepted as fully representative. All hydrological stations (CTD stations) planned at each hauling position were inspected by the RV “Baltica”. From planned 16 working days, the 15 days were utilized for fulfilling the direct survey purposes. Due to very strong wind occurred on 22.02.2007 the RV “Baltica” was stopped in this day with the survey standard activities.</p>
Additional comments:	

ICES SUBDIVISIONS (TVL,TVS)	GEAR	DEPTH STRATA (1-6)	NUMBER OF VALID HAULS REALISED		NUMBER OF VALID HAULS REALISED USING ROCK- HOPPERS	NUMBER OF ZERO- CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
			NUMBER OF HAULS PLANNED	USING "STANDARD" GROUND GEAR					
25	TVL	-9	0	0	0	0	0	0	
		8	3	0	0	0	0	0	
		9	12	12	0	0	0	2	
		10	8	7	0	0	0	0	
		11	4	5	0	0	0	0	
		12	0	0	0	0	0	0	
		13	0	0	0	0	0	0	
		14	0	0	0	0	0	0	
26	TVL	-9	0	0	0	0	0	0	
		8	0	0	0	0	0	0	
		9	2	5	0	0	1	0	
		10	2	4	0	0	0	0	
		11	5	5	0	0	1	0	
		12	2	2	0	0	1	0	
		13	0	0	0	0	0	0	
		14	0	0	0	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	LENGTH	AGE
<i>Clupea harengus</i>	5289	720
<i>Gadus morhua</i>	9263	534
<i>Pleuronectes platessa</i>	562	136
<i>Platichthys flesus</i>	3678	160
<i>Psetta maxima</i>	40	35
<i>Sprattus sprattus</i>	6310	536

NATION:	RUSSIA	VESSEL:	“ATLANTNIRO”
Survey:	52	Dates:	15 February – 05 March 2007

Cruise	
Gear details:	The large standard TV3 trawl is used. Following the recommendations in the Tow database stations are fished either without rockhoppers. The construction of the trawl follows the specifications in the manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were experienced during the survey. Some remarks: 1. The Baltic military fleet of Russia has forbidden scientific works in some squares of a territorial sea of Russia; therefore instead of trawling stations 26127 and 26146 similar trawling stations 26025 and 26022 are executed. 2. Trawling stations 28013, 28157, 28159 are in a territorial sea of Latvia and these stations are excluded from survey. 3. Trawling station 26120 is in zone of Poland and this station is excluded from survey. Trawling station 26045 is in zone of Poland and this station replace with similar station 26095 in zone of Russia. 4. Trawling stations 26121, 28063 are excluded from survey (in the absence of oxygen in a benthic layer of water). 5. Trawling stations 26042 and 26107 are made additionally.
Additional comments:	Trawling stations 26031, 26159 are necessary for excluding from Tow Database (damage of a trawl).

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF VALID HAULS REALISED USING “STANDARD” GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID STATIONS	% FISHED
26	TVL	2 (20–39m)	4	2	0	0	0	0	
26	TVL	3 (40–59m)	3	5	0	0	2	0	
26	TVL	4 (60–79m)	6	6	0	0	1	0	
26	TVL	5 (80–99m)	12	12	0	0	1	0	
26	TVL	6 (>100m)	6	6	0	0	0	0	
28	TVL	2 (20–39m)	2	0	0	0	0	0	
28	TVL	3 (40–59m)	2	1	0	0	0	0	
28	TVL	4 (60–79m)	2	2	0	0	0	0	
28	TVL	5 (80–99m)	1	0	0	0	0	0	

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):			
SPECIES	AGE	SPECIES	AGE
<i>Clupea harengus</i>	1548		
<i>Gadus morhua</i>	518		
<i>Platichthys flesus</i>	647		
<i>Solea solea</i>			
<i>Sprattus sprattus</i>	373		

NATION:	SWEDEN	VESSEL:	RV "ARGOS"
Survey:	Spring 2007	Dates:	26 February – 14 March

Cruise	
Gear details:	Sweden uses the standard TV-3#930 trawl. No tows are done with the rockhopper ground gear on harder ground stations. The trawl construction is according to the specifications in the BIFS manual.
Notes from survey (e.g. problems, additional work etc.):	No problems were experienced during the survey. Acoustic logging was not performed routinely during hauls.

ICES SUBDIVISIONS	GEAR (TVL,TVS)	DEPTH STRATA (1–6)	NUMBER OF HAULS PLANNED	NUMBER OF "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING "STANDARD" GROUND GEAR	NUMBER OF VALID HAULS REALISED USING ROCK-HOPPERS	NUMBER OF ZERO-CATCH HAULS	NUMBER OF REPLACEMENT HAULS	NUMBER OF INVALID HAULS	% STATIONS FISHED
25	TV3L	2	3	3				2	1	100
		3	11	11				5		100
		4	4	4						100
26	TV3L	2	1	1						100
		3	1	1						100
		4	3	3						100
		5	1	1			1			100
		6	3	3			1	1		100
27	TV3L	3	1	1						100
		4	5	5						100
		5	1	1			1			100
		6	3	3			3			100
28	TV3L	3	4	4				1		100
		4	4	4			1	1		100
		5	5	5			4			100

NUMBER OF BIOLOGICAL SAMPLES (MATURITY AND AGE MATERIAL, *MATURITY ONLY):		
SPECIES	AGE	LENGTH
<i>Gadus morhua</i>	1093	15015
<i>Clupea harengus</i>		9697
<i>Sprattus sprattus</i>		3751
<i>Platichthys flesus</i>		4227

Conclusion concerning the use of the results from the BITS 1st quarter 2007

The planned and realized coverage of the Baltic Sea corresponded well during the trawl survey in November 2006. Only low number of hauls was not realized in the deepest parts of

the basins due to oxygen depletion. Zero catches were assumed in these regions and datasets with validity code “N” were added to the DATRAS database when it was shown before by at least two hauls that catch was really zero at station with oxygen content of smaller than 1.5 ml/l. Following table summarizes the total numbers of realized station by ICES subdivision.

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 2007 can be used without any restrictions by the WGBFAS.

6.5 Conversion factors for CPUE of flounder captured by former national gear types and new standard gears

Intercalibration experiments between the former used national gears and the new standard gears of BITS were carried out in relation to EU project IDSBITS. Additional experiments were then coordinated by WGBIFS. Methods to estimate conversion factors of cod based on the intercalibration experiments were discussed during different meetings of WGBIFS and the estimates were updated dependent on the increasing number of intercalibration experiments.

The EU project and the analyses of data were focused on cod because the flounder stocks in the Baltic Sea are not managed by TAC until now although stock assessments were realized by WGBFAS in many years. Therefore, conversion factors for flounder were not estimated.

The ICES working group (WKAFAB) initiated new investigations which were focused on flounder in the last year. The group recommended to WGBIFS after evaluation of all available data that conversion factors between all the gears historically used during the BITS are needed for flounder.

Two options exist to estimate conversion factors for flounder in the Baltic Sea. Estimates of conversion factors of large flounder are possible based on the parameter of the used gears taking into account the two main factors which determine the catchability of the gear types, the horizontal and vertical net opening and the selectivity of the mesh size which is used in the cod end.

On the other hand the data of the intercalibration experiments can be used for estimating conversion factors. The estimated conversion factors seem to be useful trustworthy when the estimates of both independent methods are comparable.

Descriptions of the new standard gear are given in the manual of the BITS (version from March 2007). Data of the former used national gears are partly available in the literature. The coefficient between the parameter of the former used national gear and the parameter of the new standard gear was used to approximate the conversion factor between the CPUE values of the gears.

$CF(n.G., TV) = CPUE(national\ gear) / CPUE(new\ standard\ gear).$

The conversion factors were calculated between the gears which were used for the intercalibration experiments, like Granton – TVL, HG 20/25 – TVS etc. Detail descriptions of the used method are given in working document (Oeberst 2007, Appendix 4)

Intercalibration experiments were carried as paired hauls with changed sequence of the two compared gear types (see working document). Two methods were used for estimating conversion factors of cod (Oeberst *et al.*, 2000; Lewy *et al.*, 2004). Both methods incorporate the possible effect of the first haul to the subsequent haul in different ways. Presented conversion factors of flounder based on the model which is presented by (Oeberst, 2000). Means of the vertical net opening and the mean distance between the wings in meter during the hauls are given in Table 6.4.

Table 6.4. Parameter of gear types which were used during the BITS (ICES 1988, 2002).

NATION	GEAR	VERTICAL NET OPENING [M]	MEAN DISTANCE BETWEEN WINGS [M] DURING THE HAUL	MINIMUM MESH SIZE [MM]
Denmark	Granton	3.2	68.1	10
Germany	HG 20/25	2.5	13	11
Latvia	LBT	3.8	14	10
Poland	P 20/25	2.5	13	11
Russia	Hake 4M	3.8	14	10
Sweden	GOV		20	10
TV small	TV3#520	2.1	14.5	10
TV large	TV3#930	6.7	22.5	10

Conversion factors between the gears were estimated based on the horizontal net opening (Table 6.5). The conversion factors reflect the different size of the gear types. Especially, the large horizontal net opening of TVL influences the different catchability of the gear types with high probability.

Table 6.5. Conversion factors based on the mean horizontal net opening during the haul.

NATION	GEAR	CF (N.G., TVS) BASED ON HORIZONTAL NET OPENING	CF (N.G., TVL) BASED ON HORIZONTAL NET OPENING
Denmark	Granton		3.03
Germany	HG 20/25	0.90	0.58
Latvia	LBT	0.97	0.62
Poland	P 20/25		0.58
Russia	Hake 4M		0.62
Sweden	GOV		0.89
TV small	TV3#520		0.64
TV large	TV3#930		

Studies of the selectivity of the used cod end mesh size have shown that the small differences do not lead to significant differences of the catchability (see WD).

For the analyses only those datasets of the intercalibration experiments were used where the CPUE of 5 cm length interval of the both gears were larger than 3 to reduce the effect of very small catches. The same rule was used for estimating conversion factors of cod. The number of used datasets by 5 cm length classes and the sequence of the gears are given in Table 6.6. Furthermore, the conversion factors are given for the same length intervals. Also the mean conversion factors based on the length interval from 15 cm to 45 cm are added. The table shows that the number of available dataset is different for the different national gears, not only the total numbers but also the number of available dataset by sequence of the gears. Relative stable conversion factors of 5 cm length intervals were found when the number of datasets was relative high.

Table 6.6 also shows the estimated conversion factors based on the horizontal net opening. Additionally, the conversion factors for cod are given for the length range from 20 to 40 cm based on the two models which were used. The comparisons of the different conversion factors show that the estimates for flounder based on the horizontal net opening and the intercalibration experiments are comparable in two cases (HG 20/25 – TVS, TVL – TVS, TVS – LBT, TVL – GOV). The mean conversion factor based on the net opening are smaller for TVL – P 20/25 compared to the results based on the intercalibration experiments. Estimated

conversion factors of TVL – Granton significantly differed. Additional to the conversion factors for flounder two versions the mean conversion factors of large cod which are not influenced by the selectivity of the cod end mesh size are given in Table. 6.6. First estimates are based on the same method which is used for estimating the conversion factors of flounder. The second version of conversion factors is used in the DATRAS system. In many cases the different conversion factors are close together taking into account the low number of available intercalibration experiments. Therefore, it is suggested **that conversion factor based on the net opening are suitable approximations of the conversion factors of flounder. Second option is the use of the estimated conversion factors. The reasons of the very large variability of the different estimates of conversion factors of the “Granton” gear type are unclear.**

7 Plan and decide on demersal trawls surveys and experiments to be conducted in autumn 2007 and spring 2008

7.1 Extension of BITS surveys in more shallow waters

Working group WKAFAB started studies of alternative assessment methods for estimating the flounder stock in the Baltic Sea. The group evaluated the available data of flounder which are stored in the DATRAS database and recommended to WGBIFS: “To work properly for flounder the surveys need to go into more shallow water”.

To inform WKAFAB concerning the possibility to extend the regular BITS in more shallow waters the minimum working depth of the current used vessels were summaries in Table 7.1. The tables illustrates that extension of the BITS into shallower waters is not possible with the current used vessels. Therefore, it was summarised whether other vessels or cutters are available in the different counties which can properly work in shallower water (Table 7.2). The table illustrates that it is only in some coastal zones of the Baltic Sea to cover the shallower waters. Furthermore, it was pointed out that the depth layer from 10 m to 20 m is characterized by rocky bottom in the largest parts of the area. That means that the estimated stock index of this depth layer is probably biased due to the coverage of only small parts of the total distribution area. Furthermore, it must be taken into account that intercalibration experiments are necessary to be able to convert the CPUE of the new incorporated vessel-gear- combination in CPUE values of the large TV3#930.

WGBIFS recommends based on the available information that additional activities in relation to extend the BITS in shallower waters (10 – 20 m) will not be planned.

Table 7.1. Minimum working depth of vessels which are used during the regular BITS.

COUNTRY	VESSEL	MINIMUM WORKING DEPTH
Denmark	Dana	20 m ?
Estonia	Commercial Estonian vessel	10 m
Germany	Solea	15 m
Latvia	Baltica; Commercial Latvian vessel	16 m; 10 m
Lithuania	Darius	8 m
Poland	Baltica	16 m
Russia	Atlantida; Atlantniro	20 m
Sweden	Argos	18 m

Table 7.2. Minimum working depth of small cutters which can be used in shallower waters.

COUNTRY	VESSEL	MINIMUM WORKING DEPTH
Denmark	Havfisker	3–4 m
Estonia	No	
Germany	Clupea – side trawler	8 m, low number of available positions due to rocky bottom
Latvia	Commercial Latvian vessel	Special permission is necessary, rocky bottom, no available positions
Lithuania	Darius	8 m
Poland	No	
Russia	No	
Sweden	Ancylus (available for those periods?)	8 m

7.2 Plans of BITS in autumn 2007 and spring 2008

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 2007) 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 2002–2006 in the 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. Only Sweden reduced the number from 30 to 20 in autumn 2007 to realize the planned special experiments which are related to the vertical distribution of cod (see ToR j).

The total number of available stations (Table 7.3) was used in the combination with the results of relative distribution of stations by the ICES subdivision and depth layer (Tables 7.4 and 7.5) to allocate the number of total planned stations by the ICES subdivision and depth layer for the different surveys. Tables 7.6 and 7.7 present the allocated hauls by the ICES subdivision and the depth layer for the autumn survey in 2007. Furthermore, the number of hauls to be carried out by countries in the different Subdivisions is given. Tables 7.8 and 7.9 show the corresponding data for the survey in spring 2008.

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 2007.

Table 7.3. Total number of the stations which are planned by country during BITS in autumn 2007 and spring 2008.

COUNTRY	VESSEL	NUMBER OF PLANNED STATIONS IN AUTUMN 2007	NUMBER OF PLANNED STATIONS IN SPRING 2008
Germany	Solea	60	57
Denmark	Havfisken	15	15
	Total 22 + 24	75	72
Denmark	Dana	50	50
Estonia	Commercial vessel	10	
Finland			
Latvia	Chartered vessel	25	25
Lithuania	Darius	8	8
Poland	Baltica	34	38
Russia	Atlantniro	15	44
Sweden	Argos	20	50
	Total 25 – 28	237	287

Table 7.4. Basic data for allocating the hauls of the survey by the ICES Subdivisions.

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+ (2002 – 2006)	PROPORTION OF THE INDEX VALUES (WEIGHT=0.4)	PROPORTION OF THE STATIONS	SPECIAL DECISIONS (ADDITIONAL STATIONS)
SUBDIV.	[NM ²]	[%]		[%]	[%]	
22	3673	39	428	50	43	
23	0	0	0	0	0	3
24	5724	61	432	50	57	
Total	9397	100	860	100	100	
25	13762	43	437	55	48	
26	9879	31	258	33	32	
27	0	0				10
28	8516	26	93	12	21	
Total	32156	100	788	100	100	

Table 7.5. Basic data for allocating the hauls according to the depth layer for the survey by the ICES subdivision.

ICES SUB- DIV.	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+	PROPORTION OF THE DEPTH LAYER (0.4)	PROPORTION OF THE DEPTH LAYER
				(2002 – 2006)		
	[M]	[NM ²]	[%]		[%]	[%]
24	10 – 39	4174	73	226	8	47
	40 – 59	1550	27	962	33	29
	60 – 79	29	0.50	1759	60	24
	Total	5724	100	2946	100	100
25	10 – 39	4532	37	60	3	23
	40 – 59	3254	26	723	39	32
	60 – 79	3037	25	774	42	32
	80 –	1461	12	273	15	13
	Total	12284	100	1829	100	100
26	10 – 39	2379	23	11	1	14
	40 – 59	1519	15	180	13	14
	60 – 79	1911	19	599	45	29
	80 – 100	2872	28	257	19	25
	100 – 120	1504	15	293	22	18
	Total	10185	101	1340	100	100
27	10 – 39	1642	31			18
	40 – 59	1101	21	16	14	18
	60 – 79	996	19	77	67	38
	80 –	1596	30	22	19	26
	Total	5335	100	114	100	100
28	10 – 39	2589	39	4	1	24
	40 – 59	1598	24	35	7	17
	60 – 79	1101	16	212	44	27
	80 – 100	1389	21	232	48	32
	Total	6677	100	484	100	100

Table 7.6. Allocation of the planned stations by country and the ICES subdivision in autumn 2007.

COUNTRY	TOTAL	ICES SUBDIVISION						
		22	23	24	25	26	27	28
Denmark	65	12	3		40	10		
Estonia	10							10
Finland	0							
Germany	60	19		41				
Latvia	25					12		13
Lithuania	8					8		
Poland	34				28	6		
Russia	15					15		
Sweden	20				5		7	8
Total	237	31	3	41	78	51	7	31

Table 7.7. Allocation of the planned stations by ICES subdivision and depth layer in autumn 2007.

ICES SUBDIV.	22	23	24	25	26	27	28
DEPTH LAYER [M]							
10 – 39	31	3	18	17	7	2	7
40 – 59			12	23	7	2	5
60 – 79			10	23	15	1	9
80 – 100				10	13	2	10
100 – 120					9		
Total	31	3	40	73	51	7	31

Table 7.8. Allocation of the planned stations by country and ICES subdivision in spring 2008.

SUBDIVISION								
COUNTRY	TOTAL	22	23	24	25	26	27	28
Denmark	65	12	3		40	10		
Estonia								
Finland								
Germany	57	18		39				
Latvia	25							25
Lithuania	8					8		
Poland	38				35	3		
Russia	44					44		
Sweden	50				23		10	17
Total	287	30	3	39	98	65	10	42

Table 7.9. Allocation of the planned stations by ICES subdivision and depth layer in spring 2008.

ICES SUBDIV.	22	23	24	25	26	27	28
DEPTH LAYER [M]							
10 – 39	30	3	17	23	9	3	10
40 – 59			12	31	10	2	7
60 – 79			10	31	19	2	12
80 – 100				13	16	3	13
100 – 120					11		
Total	30	3	39	98	65	10	42

8 Update and correct the tow database

8.1 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 2006 and partly of the survey in spring 2007 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. Positions of new hauls were presented by different countries. These data were added to the Two Database. 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_2007V2.XLS will be made available for all countries

8.2 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

8.3 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
 - south western 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".

Figure 8.1 presents the units with size of 15'N x 20'E of the eastern Baltic Sea which are used for selecting stations of the BITS. Units where haul positions are not available in the Tow Database are marked by dark grey colour. Figure 8.2 shows the same information for the western Baltic Sea. Especially for these units additional haul positions are required to improve the total coverage.

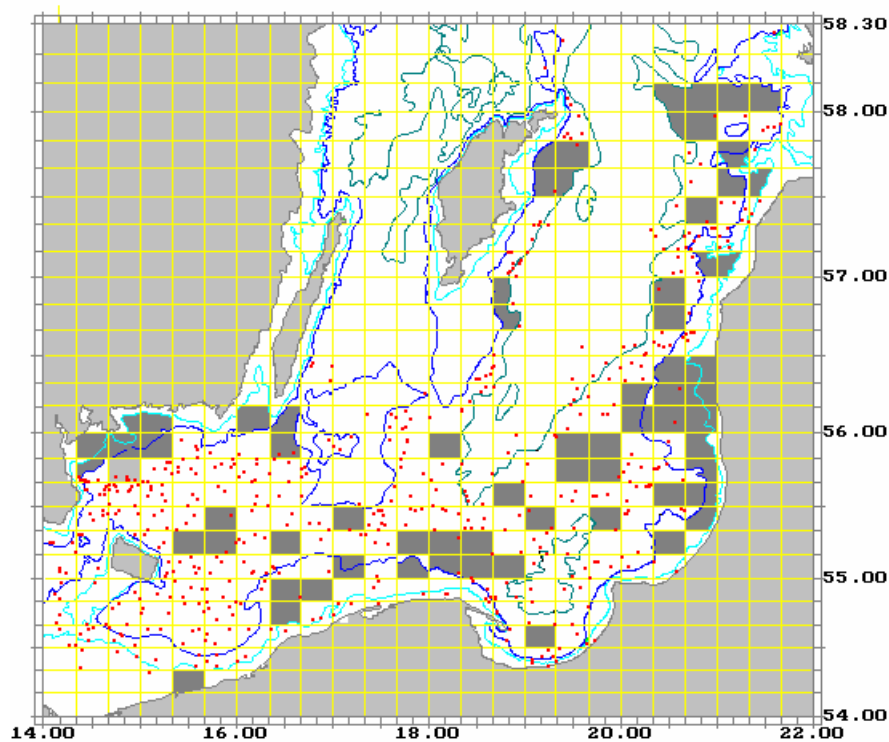


Figure 8.1. Eastern Baltic Sea with units of 10'N x 20'E and marked white areas where haul positions are not available in the Tow Database (dark grey).

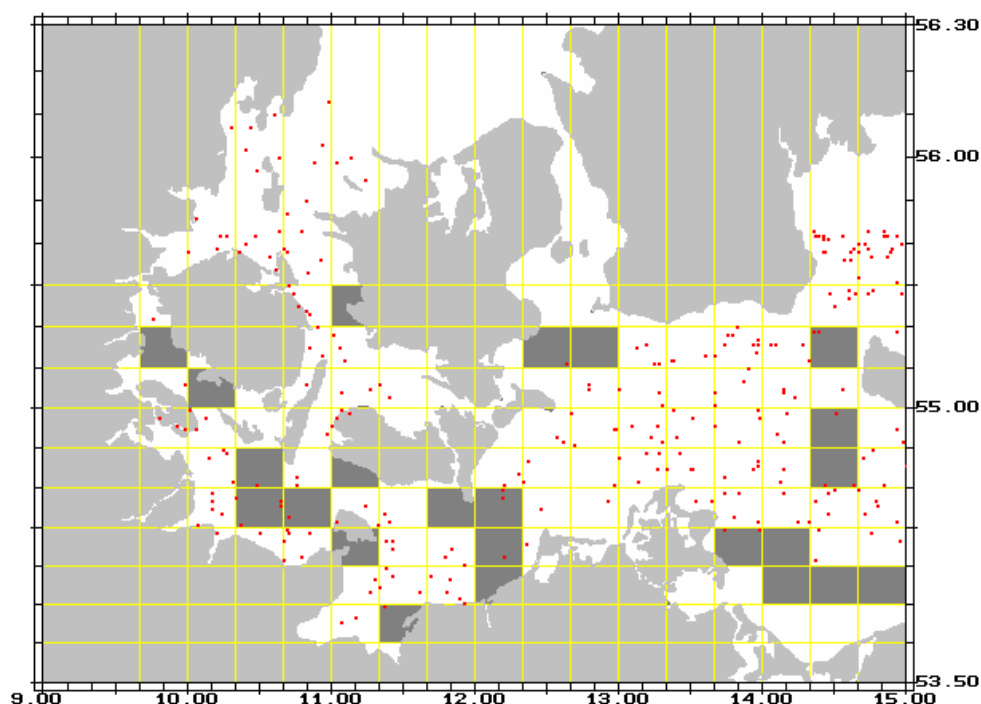


Figure 8.2. Western Baltic Sea with units of 10'N x 20'E and marked white areas where haul positions are not available in the Tow Database (dark grey).

9 Review and update the Baltic International Trawl Survey Manual (BITS)

9.1 Workshops of ICES related to the DATRAS system

Two workshops were carried out by the ICES data centre in May 2006 and February 2007 to discuss possible improvements of the DATRAS system where data of different international coordinated trawl surveys are store. Additional funding by the EU made these improvements possible. In reaction to the funding EU required at least estimates of the quality of the stock indices which are estimated by the surveys.

The workshop in May 2006 was concentrated on the estimation of the quality of stock indices (ICES, 2006 a, b). It was required that the same method is used for all surveys, that special knowledge and additional data are not required for understanding the results and that the results can be easily explained without special knowledge. Different methods were evaluated like variance estimators, geo statistical methods, bootstrap and GLM / ALM. The group agreed that bootstrap is the most appropriate method which estimates confidence intervals without special requirements concerning distribution parameters of CPUE values. The first versions of the procedures are available now.

The workshop in February 2007 was concentrated on extensions and improvements of the DATRAS system. It was proposed to realize the uploading of national data into the DATRAS system based on the internet without any activities by members of the data centre of the ICES headquarters. This new uploading process contains the screening of the data. Two types of messages are defined. Error messages like (wrong positions) must be corrected. Warnings which inform concerning unreliable datasets like length – weight data in CA records must be checked. After checking the data warning will be accepted be the system.

Furthermore, screening of CA data which were agreed during the workshop in Gdynia 2006 will be part of the screening procedures. Length – weight relation will be used to detect unreliable dataset. In addition XY plots of age- length and maturity – length will be produced.

Additional tools will be prepared to estimate maturity ogives and weight at age where length stratified methods are applied. The result will be in a format which can be easily incorporated by the assessment working groups. Besides these topics it was discussed whether it is possible to add new parameters/measurement to the DATRAS system. The proposals of the different survey and assessment working groups will be summarized by the data centre of ICES.

One of the most important reasons for uncertainties of the stock indices of cod in the Baltic Sea is ageing. Different study groups and analyses have documented different interpretation of the structure of otolith and the effects concerning the stock assessment. Besides the different interpretation of the ring structure the uncertainty of the interpretation due to low differences of the otolith structure affects the assessment. To improve the possibilities for analysing the effects of different interpretation it is proposed to add a quality flag which describes the certainty of the reader concerning the interpretation. The additional information can be used to estimate stock indices based on different basic data where only age data with flag 1 were used in contrast to all age data.

9.2 Reworking of the BITS manual and proposed additional fields

The BITS manual was restructured and was reworked between the meeting in 2006 and 2007. The new version was discussed by mail and during the meeting. Some additional changes were proposed and agreed during the meeting. Furthermore, it was agreed that for the BITS the field SurTemp, BotTemp, SurSal and BotSal is defined as mandatory. That means that these data which are sampled during BITS will be regularly stored in the HH datasets by all countries beginning with BITS in autumn 2007.

SurTemp	54	4	✓	decimal1	-1.0 to 30.0	in °C
BotTemp	55	4	✓	decimal1	1.0 to 20.0	in °C
SurSal	56	5	✓	decimal2	10.0 to 38.0	in PSU
BotSal	57	5	✓	decimal2	20.0 to 38.0	in PSU

Surface and bottom are defined as the upper and deepest available value in the datasets which are sent to the ICES data centre.

Furthermore, it is required to add a new option for the haul duration, HaulDur. Haul duration of 0 minutes must be allowed for hauls with a validity code “N” (the oxygen content on the bottom is below the recommended minimum).

For improving the usability of flounder data which are stored in the DATRAS system for the stock assessment it is recommended by the WGBIFS that length measurements of flounder during the first quarter BITS and the registering of the results in the DATRAS database are mandatory.

Flounder is one of the main target species of BITS. The data are used by the assessment working group. Therefore, and according to the agreed BITS manual it is required that CA data on length, age, sex, maturity and weight for Baltic flounder are sampled by all countries. The same intensity of samples is required for flounder as for cod (see BITS Manual).

9.3 Comments concerning ICES Workshops in May 2006 and February 2007

One of the most important reasons for uncertainties of the stock indices of cod in the Baltic Sea is ageing. Different study groups and analyses have documented different interpretation of the structure of otoliths and the effects concerning the stock assessment. To improve the

possibilities for analysing the effects of different interpretation it is proposed to add a quality flag, which describe the certainty of the reader concerning the interpretation.

Codes for ageing quality:

- 1) Certain interpretation
- 2) Uncertain interpretation
- 3) Not interpretable

All above-mentioned proposals of changes in the DATRAS exchange format should be adequately reflected in update of the screening programme.

10 Review and update the Baltic International Acoustic Survey Manual (BIAS)

WGBIFS agreed that high ping rate (constant – 0.3 seconds between pings) will be used during the acoustic surveys in May and October. It should be pointed that the calibration of the equipments must be realized with the same ping rate.

During the last two years several suggestions were expressed about the necessity of updating “Manual for the Baltic International Acoustic Survey”. Some of them were recommended to further investigations but others were recommended to include in the document. The updated manual is included in the Addendum of the report. The main correction was in the chapter 4, n. 4.3.1 and 4.2 of the Manual describing the procedures for estimating species composition and length composition of each species from the trawl data.

The Working group also discussed the method of data processing in the cases when there are several species in the trawl catches but not only sprat and herring. It was recommended to develop some rules determining the procedures of calculations in the cases when target strength is unknown and when it is possible to omit species from calculations (i.e. when part of those species do not exceed 1% of total number of fish).

10.1 Combination of the results of fishing stations during acoustic surveys in the Baltic Sea

Analyses related to the combination of fishing stations during acoustic surveys were discussed during the last meetings. The studies have shown that the current use method of the combination of the fishing station can produce biased estimates and a new model was developed (Oeberst and Götze 2006a). Estimated stock indices based on both methods were presented during the Annual Science Conference in 2006 (Oeberst, Götze 2006b). The comparisons were carried out with data from the acoustic surveys in the ICES subdivision 25 in May 2003 and 2004.

The new model reflects the observed relations between the total s_A -values and the s_A -values of the target species during the fishing stations. The studies have shown that only s_A -values of sprat age 1 and/or age 2+ increased when total s_A -values increased. Figure 10.1 and 10.2 illustrate the results of the acoustic survey in the ICES subdivision 25 in May 2003 and 2004.

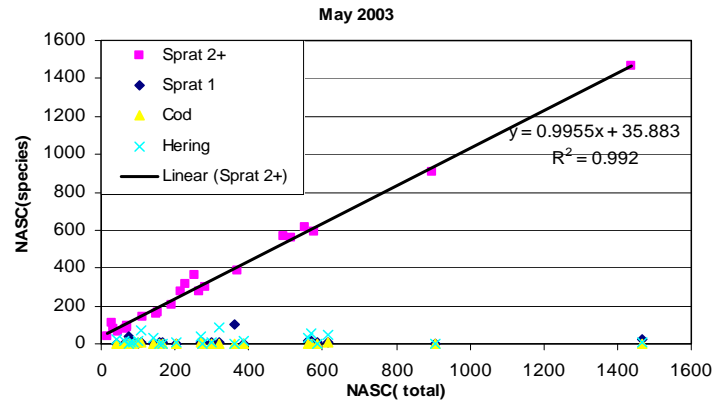


Figure 10.1. s_A -values of target species during the fishing stations in the ICES subdivision 25 in May 2003.

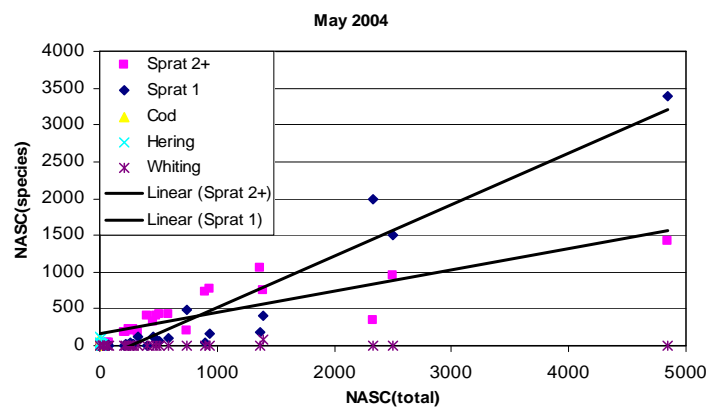


Figure 10.2. s_A -values of target species during the fishing stations in the ICES subdivision 25 in May 2004.

In May 2003 the total density is dominated by sprat age group 2+. The other densities of the other target species are comparable in the total area and are not correlated with the total s_A -values.

The situation in May 2004 was different. The total density is influenced by sprat age group 1 and age group 2+. The high s_A -values of sprat age group 1 suggest that this year class is significantly larger than the year class of the year before. The Figures also illustrate that the most fishing stations were located in areas with low total density.

The studies have shown that the estimated stock indices of the target species sprat age group 1 and sprat age group 2+ of both methods significantly differ. Stock indices based on the acoustic survey in 2003 are given in Table 10.1. Estimates of Model I are based on the current used method of combining the results of fishing stations. Estimates of Model II present data which are based on the new model. Estimates of Model I of age group 1 are significantly smaller than the estimates of Model II. Otherwise, the estimates of sprat age group 2+ are comparable and estimate of sprat age group 1 in May 2004 based on Model II are about three times larger than the estimate of Model I (Table 10.2). Furthermore, estimate of age group 2+ based on Model II are smaller than estimate of sprat age group 2+. These significant differences show that it is necessary to realize further analyses to investigate the effects in relation to the total sprat stock and possible effect in relation to the acoustic surveys in October.

Table 10.1. Estimates of stock indices in the ICES subdivisions 25 by target types based on the acoustic survey in May 2003.

SD25	MAY 2003				
Year	Herring	Cod	Whiting	Sprat 1	Sprat 2+
Model I	772.9	6.5		1071.4	10481.0
Model II	587.2	6.5		1545.0	10872.6
Model I - current use method of combining the results of fishing stations					
Model II – new model					

Table 10.2. Estimates of stock indices in the ICES subdivisions 25 by target types based on the acoustic survey in May 2004.

SD25	MAY 2004				
Year	Herring	Cod	Whiting	Sprat 1	Sprat 2+
Model I	1562.7	56.8	7.8	8328.2	18743.7
Model II	690.5	40.7	75.4	20005.3	13377.0
Model I - current use method of combining the results of fishing stations					
Model II – new model					

The results of the ICES Subdivision 25 can not extrapolated to the other ICES Subdivisions because the spatial distribution of the target species varies from year to year. To estimate the possible effects in relation to the total sprat stock data of all subdivision of the same survey must be analysed. WGBIFS recommends that such type of analyses should be realized until the next meeting. To realize the studies it is necessary to summarize the necessary data in one database. Following data are required for the analyses:

Structure of required data for the analyses

Number of fishing station

Position of fishing station (Latitude, Longitude)

Subdivision

Water depth

Depth of headline

Vertical net opening

total s_A Value during the fishing station

σ_i Value of all target species, i , during the haul

π_i Proportion of target species, i , based on number of individuals of the fishing station

Mean s_A value of the subdivision

Target species:

Sprat age group 1

Sprat age group 2+

Herring, etc

Most of the data are available in databases because they are necessary for the current used method. Only the s_A -values during the fishing stations are not routinely stored and it is not possible to select the data by standard procedures from the database. Therefore, it is necessary to select the total s_A -values of the fishing stations from the echo data. This is technical easy but time consuming.

WGBIFS **recommends** that the countries prepare the necessary data of all fishing stations which were realized during the acoustic surveys in May 2003 and May 2004 and make the

data available for assessing the possible effect of the proposed method in relation to the Baltic sprat stock. WGBIFS **recommends** that Germany realize the analyses and presents the results during the next meeting.

To improve the quality of stock indices based on acoustic data WGBIFS, furthermore, **recommended** that the same data are stored and analysed for both acoustic survey in 2007. That means that only one additional activity is required, the storage of the s_A -values during the fishing stations. The other data are available based on the standard sampling.

References

Oeberst, R., Götze, E. 2006a. Combination of trawl results during acoustic surveys – CASE STUDY. Working document of the Baltic International Fish Survey Working Group, 3–7 April 2006, Copenhagen, Denmark, 15 pp.

Oeberst, R., Götze, E. 2006b. Combination of trawl results during acoustic surveys – CASE STUDY. ICES CM/I:33.

10.2 Review of working documents devoted BIAS uncertainty estimates

Three working documents (Annex 3) were presented describing the results of investigation which are related to the estimation and integrating of the total uncertainty of stock indices which are estimated by the acoustic surveys in October (BIAS).

The working document “Analysis of the acoustic S_a index statistical characteristics based on the data obtained from the vessels, participants in the International Acoustic Surveys in the Baltic Sea” studies the spatial variability of acoustic S_a index, one of the main source of the uncertainty of acoustic survey results. Statistical characteristics of S_a index of the acoustic surveys in October 2005 were presented which were obtained based on different stratification of the area under investigation (ICES rectangles, area covered by individual vessels, statistical Subdivision ICES). The comparison of the uncertainty of S_a index based on the different stratification can be used for optimizing the stratification of the area under investigation with in the BIAS area.

The working document “Estimation of abundance index uncertainty from the data of the Baltic International acoustic survey” shows the possibility to unify the processing of BIAS data by considering the data from individual vessels as one observation system. This method allows assessing abundance indices accompanied by their accuracy estimates applying modified stratification level in the BIAS area (strata as area covered by individual vessels, strata as the Statistical Subdivision ICES) as the practicable alternative to traditional data processing by ICES rectangle. The insufficiency of number of trawl stations in the majority of rectangles prevents the estimation of uncertainty of abundance indices from BIAS which is required by ICES Committee and WGs.

The working document “Analysis of the acoustic index field structure with geostatistic methods based on BIAS data” studies the spatial variability of S_a values to provide basic information to optimize the stratification of survey area. Information of all vessels which realized acoustic surveys in October 2005 (BIAS) were used. Considerable differences were revealed between experimental variograms (directional and omnidirectional) and model variograms obtained for different statistical Subdivisions which are used as a set of stratum of BIAS area. These differences are apparent in the “nugget effect” parameters, in values of sill and in the range (the maximum distance between the points with correlated values). That means that the ICES subdivision can be used as a version of BIAS stratification as a real alternative to stratification by the ICES rectangles.

WGBIFS recommends based on the discussion of the presented studies to analyses datasets from other years (see TOR B, recommendations above) extending the period of analyses data.

The different studies of the last years clearly suggest that alternative stratification schemes of the Baltic Sea should be taken into account. Therefore, it is proposed that the “acoustic subgroup” which was established in 2006 discuss alternative types of stratifications (advantages and disadvantages) until the next meeting. The results of the discussions which incorporate the results of the studies which were recommended by WGBIFS will be presented during the next meeting.

11 Study the vertical distribution of fish during the BITS survey in a situation with oxygen deficiency close to the bottom

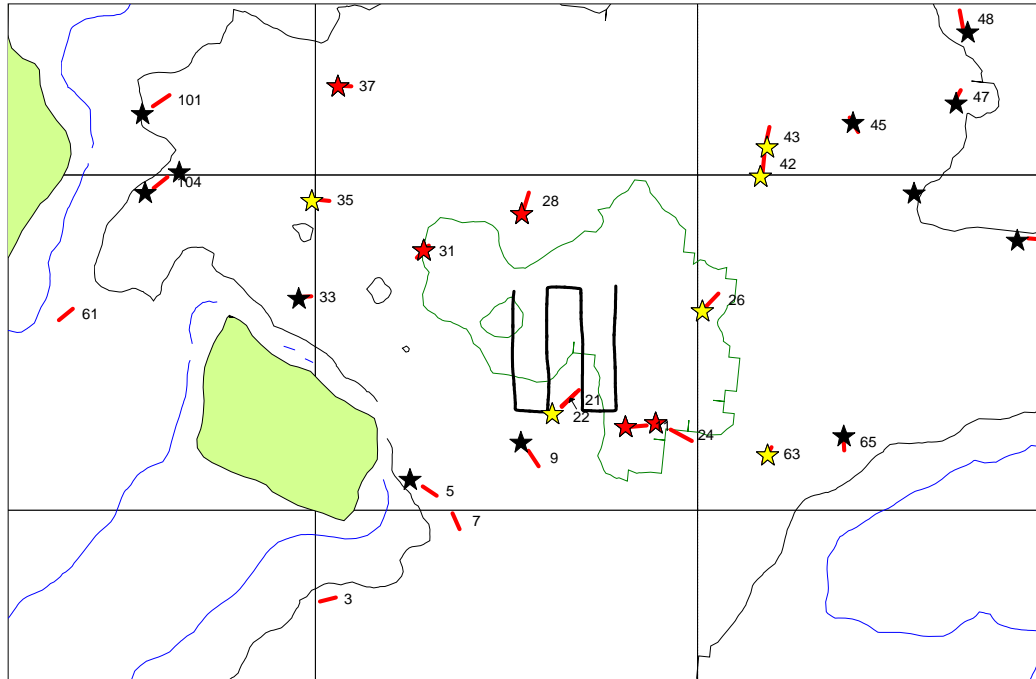
11.1 Acoustic measurements during BITS in autumn 2006

Special experiments were realized by Denmark, Poland, Russia and Sweden during the BITS in autumn 2006 to estimate the proportion of cod in pelagic water above the area covered by standard gear in regions with oxygen depletion close to the bottom. Areas of 15 nm x 15 nm were studied by acoustic methods in combination with midwater trawls to estimate the species composition. Two hydro acoustic methods were used to estimate the cod density in pelagic waters. Cod were identified by allocating single echoes to one fish and counting the resulting fish tracks. Additionally, cod abundance was estimated based on S_A -values at certain selected depths similar to the regular acoustic survey.

11.1.1 Danish experiments in Subdivision 25

During the BITS 4th quarter 2006 three mid-water hauls were done in order to investigate the amount of biomass of cod in the water column during oxygen deficiency near the bottom. The procedure for the trials were as follows:

- A 15x15 nm area with less than 0.5 ml/l was identified by use of 11 CTD stations. The only area possible was in connection to the Bornholm deep. The CTD stations are shown on the map below.
- A transect covering the area was made using acoustic logging.
- Based on the acoustic diagrams a number of positions were selected for mid-water trawling because the echogram showed significant echoes indicating the existence of fish biomass.
- Only three haul were realised due to technical difficulties. The haul duration was in all cases 30 min using an EXPO trawl. The depths of the hauls were made so it was covering the thermo cline where the biomass of cod was expected to be. Two of the hauls were made on the same position but in different depths (station 22 and 24 on the map below).



Tracks= hauls performed.

Stars=CTD stations (black > 1 ml oxygen/l, yellow 1.0 <ml oxygen/l>0.5, red < 0.5 ml oxygen/l.

No analysis of the results has been made yet except that the numbers of cod caught during the experiment were very few (between 0 and 20), which suggesting that only few cod are migrating vertically when they experience low oxygen content in the area close to the bottom.

11.1.2 Swedish experiments in Subdivision 25

During the BITS 2006 Q4 an approach was made to assess the density of cod in an area with near bottom oxygen deficiency. We used echo integration and pelagic trawling as described in the BIAS Manual except for that we used maximum ping rate and pulse length 0.256 ms. We performed nine pelagic hauls with the revised Fotö oneship pelagic trawl with 6 mm mesh bar in the cod end. Only S_A -values obtained during the hauls and at fishing depth were used for calculations. The BI500 post processing software was used, which meant a maximum horizontal resolution of 0.1 NM and a vertical resolution of 10 m depth channels. The catch compositions of the hauls were not considered representative for the depth channels above 50 m and these channels were not included in the density assessment. The trawl catches by weight are shown in Table 11.1 and the survey statistics in Table 11.2.

Table 11.1. Catch composition in pelagic hauls by RV Argos during the BITS 2006 Q4.

Sum of Catch weight	Haul Headrope depth (mean)						
	701	702	703	709	710	711	717
Species	65	63	61	55	62	55	57
CLUPEA HARENGUS	174.4	15.3	10.5	15.1	8.0	20.9	6.4
CYCLOPTERUS LUMPUS			0.3				
ENGRAULIS ENCRASICOLLUS			0.1			0.0	0.1
GADUS MORHUA	17.1	40.5	32.3	29.9	19.1	36.7	20.5
MERLANGUS MERLANGUS		0.1	0.9	0.1		0.8	0.2
PLEURONECTES PLATESSA			0.4			1.1	0.3
SOOMBER SOOMBRUS							
SPRATTUS SPRATTUS	20.6	1040.7	95.1	114.2	87.4	342.0	132.8
Grand Total	212.1	1096.6	139.6	159.2	114.5	401.4	160.3

Table 11.2. RV Argos survey statistics, BITS November 2007, at fishing depth.

HAUL	HEADROPE	OPENING	SA	SIGMA	N TOTAL	HERRING	SPRAT	COD	NHERRING	NSPRAT	NCOD
NO.	DEPTH (M)	(M)	(M ² /NM ²)	(CM ²)	PER NM ²	(%)	(%)	(%)	PER NM ²	PER NM ²	PER NM ²
701	65	16	75.37	2.79	269650	73.98	25.55	0.47	199491	68896	1263
702	63	14	350.67	1.29	2712814	0.45	99.48	0.07	12153	2698694	1942
703	61	15	103.99	1.82	572575	3.66	95.32	0.84	20951	545805	4818
709	55	16	82.40	1.25	657481	3.94	95.79	0.27	25895	629781	1763
710	62	13	50.40	1.33	380302	2.34	97.34	0.32	8891	370193	1218
711	55	14	70.54	1.18	597530	1.50	98.35	0.13	8965	587692	777
717	57	11	96.25	1.25	767897	1.64	98.10	0.21	12585	753310	1621
718	60	14	111.37	1.23	903272	2.37	97.31	0.26	21410	878999	2370
719	58	15	308.05	1.11	2776914	1.17	98.48	0.22	32427	2734822	6041

An attempt to count tracked cod was also made. Sonar 5 was used and the whole water column was analysed during 10 different hauls, and 8 of those hauls had oxygen deficiency. Tracks with less than -38.5 dB were discarded. The number of cods per surface area at different depths in the beam was normalized to No. cod per area at 50 m in the beam. Figures from the 8 hauls with low or none oxygen was compared with the 2 "normal" hauls and was found to be similar. An overview of the Figures and the calculations were presented at the meeting.

11.1.3 Russian experiments in Subdivision 26

According to the recommendation of WGBIFS in 2006, experimental work was carry out in area with oxygen deficiency close to the bottom. The area for survey which covered 15x15 nm² was chosen based on the hydrological survey accompanied bottom trawling survey. Within the border of the chosen area 3 pelagic and one bottom trawling were carried out. Bottom trawl was carried out as part of the bottom survey. The catch was 0 kg and the oxygen content in bottom layer was less than 1.5 ml/l (trawl №11, Figure 11.1). Figure 11.1 shows the chosen area and distribution an index of density SA, in pelagic is shown. A depth for S_A-analysis was from -5.6 meters from a bottom, up to 40 meters from a surface. Additional pelagic hauls were carried out in the area under investigation (№ 41, 40, 42). The numbers of captured cod by haul were 42, 20 and 8. These results suggest that it is necessary to estimate the cod density in the pelagic layer in areas with oxygen deficiency close to the bottom. The cod density in the total area was not estimated based on the standard method of the acoustic surveys. Instead of that tracing of single cods in the echo data were realized, but, uncertainty

exist due to the dominance of the echo signals by scattered layers of small fish like sprat and sprat schools with high densities (Table 11.3).

With reference to the bottom experiment it is necessary to note, that in spring (February) and summer (May – June), the share of cod in pelagic layers is much higher, than it was observed in this case, therefore at the subsequent researches it is expedient to take into account this circumstance.

Table 11.3.

DATE	TRAWLNO	ICES RECT	DEPTH M	LEVEL TR	VERT OPEN_M	CATCH HOUR_KG	NUMB COD	NUMB COD_%
29.10.2006	40	3964	95–96	60–61	29	500.2	42	0.177
29.10.2006	41	3964	96	62	30	85.3	20	0.876
30.10.2006	42	3964	100	63–65	31–30	216,6	8	0.142

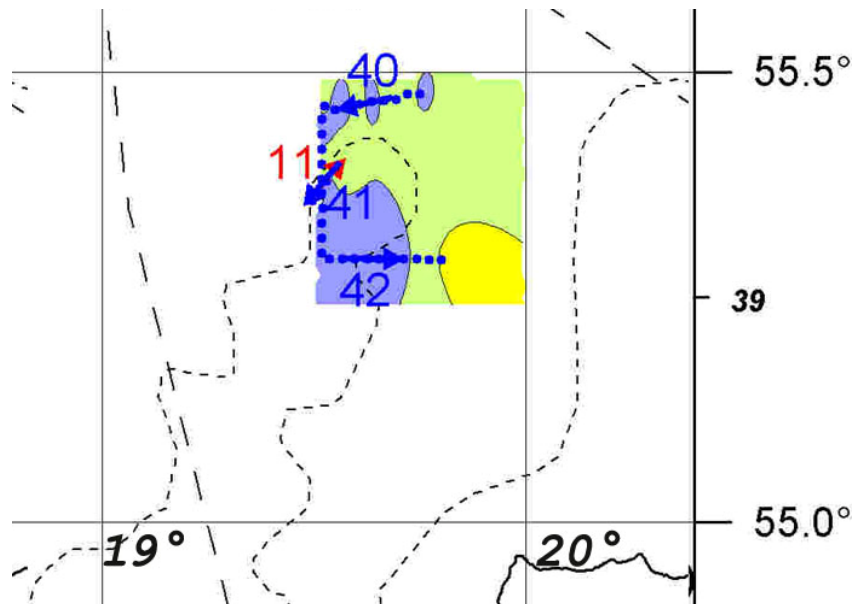


Figure 11.1. The map of S_A -values distribution in low-oxygen experiment on the Russian area of international acoustic survey. (RV “ATLANTNIRO”, 04.10 – 01.11.2006)

11.2 Conclusions based on the experiments in autumn 2006

Preliminary results of the additional fishery hauls with midwater trawls during autumn BITS survey in SD 25 and 26 show a proportion of cod being distributed in the water column above the oxycline in deep areas of the central Baltic with oxygen depletion above the bottom. The abundance of cod resulting from the studies was different. Sweden observed densities of cod in the ICES Subdivision 25 comparable with catches of 100 to 600 individuals of the standard haul with the gear type TVL. Estimates from Denmark were significantly smaller as no cod were caught in midwater. Analysis of corresponding echo recordings is going on to evaluate presence of cod in the layers covered by trawl or those above and below. Russia observed lower densities of cod in the pelagic waters of the ICES Subdivision 26.

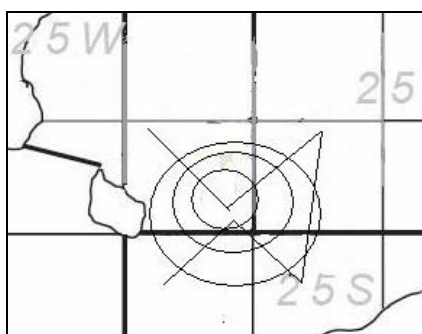
All results together suggest that it is necessary to incorporate acoustic measurements and further midwater hauls to cover pelagic layers in areas in SD 25 and 26 with clear oxygen

depletion close to the bottom in addition to standard bottom trawl fishery hauls in adjacent oxygenated areas during the BITS in November.

The following design was proposed:

Acoustic measurements will be carried out continuously during the total time of BITS. The settings of the acoustic equipment required for the resolution of cod are given below. To estimate the cod density in pelagic waters in areas with oxygen depletion in deep water layers, additional midwater trawls will be used to estimate the species and length composition in that areas. Comparative studies will also be made and therefore it is important that the echo sounder is set to collect high ping rate data all trough the survey so that as much data as possible is collected from both oxygen depleted areas and from areas with good oxygen conditions as well as the intermediate areas.

Additional to this procedure Sweden will conduct acoustical investigations and try to describe the possible change of cod density perpendicular to the oxygen gradient, by making transects from areas with good oxygen conditions to areas in the deep basin containing the oxygen depletion zone in the centre. Several transects will be conducted back and fourth trying to model a possible change in the abundance as a function of the varied oxygen, see the following Figure.



11.2.1 Proposed additional echo sounder settings, exchange of data and analyses

Echo sounder settings applied during the forthcoming surveys should be applied to meet requirements for acoustic single fish tracking. This will comprise a high ping rate (3 pings per second) to maximize number of echo hits on a single fish for reliable tracking. A short pulse duration for a better vertical resolution is preferable if you intent to study the behaviour of the cod with tracking. On the other hand if you intend to use traditional abundance estimations using Sa values a low pulse duration could constrict comparability with the standard BIAS survey because of probable altered scattering characteristics of the fish schools. GPS-data as well as time of day etc. should be incorporated in echo data. To enhance comparability of acoustic data to fishery hauls and save time in the post processing, corresponding start and end positions (incl. date, time) should be indicated in the raw data file names. A heave/roll/pitch-sensor for the compensation of ship movement would be preferable, but availability on participating vessels is unclear.

Echo tracking and further analyses will be based on raw-data collected with a split-beam scientific echosounder at 38.0kHz. Additional frequencies for the enhancement of single fish identification should –if available- be operated simultaneously. Echosounder should be calibrated at the according settings with the standard copper sphere method prior to the cruise. Fish-tracking will be based on target-strength (TS) and angular position data.

Software used for identification of single fish echoes and further tracking will be Sonar 5 and EchoView. Corresponding settings for proper identification of signals from single scatters as

well as tracking algorithm settings will be inter-calibrated separately to guarantee identical, software independent tracking results. Therefore, exemplary datasets containing raw-data from echo recordings will be exchanged and analyzed. Detailed settings of TS threshold (to prevent inclusion of signals from (big) clupeids), maximal acceptable TS variance within proposed track, maximal ping gap between signals for track acceptance and weighing of along and athwart transition of cod through acoustic beam have to be discussed separately.

11.2.2 Expected outcome of additional analyses

As there is indication that there are cod in pelagic layers above oxygen depletion zones in similar densities to those observed demersal in oxygenated areas, the proposed analyses should allow to quantify cod abundance in these regions and thus enhance BITS output.

11.2.3 Data and echosounder settings required for acoustic evaluation of vertical cod distribution

Preliminary results of additional experiments with pelagic trawls in SD 25 and 26 during the autumn BITS survey in 2006 show a proportion of cod being distributed in the water column above the oxycline in deep areas of the central Baltic with an oxygen depletion in deeper layers. It has been agreed to incorporate hydro acoustic data in future surveys to evaluate the proportion and density of cod being distributed in pelagic layers and to further conduct pelagic hauls with midwater trawls in that regions. Echosounder settings applied during the surveys therefore should be according to meet requirements for single fish tracking.

Requirements for single fish tracking:

- Short pulse duration (high vertical resolution as needed for tracking, but not in compliance with BIAS settings and discussed, as this changes scattering characteristics of fish and thus generally constricts comparability with preceding and current BIAS survey results)
- High ping rate (constant – three pings per second)
- Inclusion of GPS-data in raw echodata
- Indication of GPS-position and time/date of begin and end of each fishery haul conducted
- (a heave/roll/pitch sensor for the compensation of ship-movement – availability unclear)

Tracking will be based on raw-data sampled with an 38.0 kHz Simrad split-beam Scientific Echosounder properly calibrated at the according settings with the standard copper sphere method prior to the cruise. It is recommended that hydro acoustic data are recorded continuously during the cruise. Target-Strength (TS) data and angular position data then can be used for hydro acoustic single fish tracking.

Software used for tracking will be Sonar 5 and EchoView – settings for the proper identification of signals from single scatters as well as tracking algorithm settings will be inter-calibrated separately to guarantee identical, software-independent tracking results. Focus should be set on:

- TS threshold to prevent inclusion of signals from (big) clupeids
- Maximum TS variance within proposed track
- Maximum ping gap between signals for track acceptance
- Weighing of along and athwart transition of cod through acoustic beam

12 Discuss the extension of the DATRAS data in time and space

The extension of the DATRAS data in time and space was discussed during the meeting. The willingness of uploading additional data from 2nd and 3rd quarter, and availability of historical (pre 1991) survey data was inquired from all countries with a table presented below.

Most countries seem to have such data, but its quality assurance was generally considered to be a problem. Recording from hard copies, checking of datasets and possible converting of records, e.g. changing former maturity scaling to present, requires time and/or extra resources, and therefore uploading the data within short time period is not possible.

WGBIFS recommends that until next meeting all countries should evaluate the effort needed for checking their data and uploading possibilities.

COUNTRY	DATA AVAILABLE		PERIOD/YEARS	WILLINGNESS TO UPLOAD		MAIN OBSTACLES
	NO	YES		YES	NO	
DENMARK		X	< 1991	X		Data still needs to be quality assured.
ESTONIA	X					
FINLAND	X					
GERMANY		X	1981 - 1990	X		It is time consuming to check the data of these surveys, it will not be possible to upload the data within short time period
LATVIA		X	< 1991		X	It is time consuming to transference the data from hard copy format in electronical database and to check the data of these surveys, moreover, at present time Latvia has not the men power to realize this work
LITHUANIA		X	2004-2007		X	
POLAND		X	< 1991		X	It is time consuming to transference the data from hard copy format in electronical database and to check the data of these surveys, moreover, at present time Poland has not the men power to realize this work
RUSSIA		X	1993-2006		X	The data are ready, however completion and check of the data is necessary
SWEDEN		X	from 1988, possibly 1882	X		Quality checking is necessary, especially maturity scale used!

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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 Gdynia, Poland from 31 March to 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;
- 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.

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:	<p>The above Terms of Reference are set up to provide ACFM with information required to respond to requests for advice/information from the International Baltic Sea Fishery Commission and Science Committees.</p> <p>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 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. In recent years activities have been devoted to coordinate international coordinated demersal trawl surveys using the new standard gear TV3 and to continue the analyses of the conversion factors between the new and old survey trawls. 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 for autumn 2007.</p>

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 hydroacoustic 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 the Baltic International Fish Survey
Secretariat Facilities:	Normal Secretariat facilities are necessary for running the meeting.
Financial:	
Linkages To Advisory Committees:	ACFM: 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:	IBSFC
Secretariat Marginal Cost Share:	ICES:80% IBSFC:20%

Annex 3: Recommendations

WGBIFS recommended following to the different expert groups:

RECOMMENDATION TO WGBFAS
WGBIFS recommends that the area corrected data from the acoustic survey in October 2006 can be used in the assessment of the herring and sprat stocks in the Baltic Sea without any restrictions (Section 2.1.5).
WGBIFS recommends that the area corrected stock indices based on the acoustic surveys in May/June from 1999 to 2006 (Table 2.2.7) can be applied as additional time series (fleet) for tuning in the final assessment of the Baltic sprat stock biomass (Section 2.2.4).
The WG recommends that the acoustic surveys in May should be continued. In future the coverage of the SD 29 should be taken into account (Section 2.2.4).
Although the reworking of the BAD1 database is not finished yet it was agreed that the current version will be made available for the assessment working group combined with the information that this is a preliminary reworked version. After correction of all data the final version will be made available for all countries and the WGBFAS (Section 3)
The estimation of the uncertainty (variance, coefficient of variations, confidence intervals) for the stock indices as it was recommended by WGBFAS 2006 is not possible based on the aggregated data which are stored in BAD1 (stock indices by rectangles). First studies related to this topic were realized by Russia using all source data of the surveys which were realized in 2005. Additional studies are possible when all source data are stored in BAD2 version of FishFrame. To speed up the studies it is proposed that the source data of the acoustic surveys in 2004 and 2006 are submitted to Russia (Svetlana Kasatkina and Pavel Gasyukoy) in the old BAD 2 and the BAD2 FishFrame format until July 2007 (Section 3.1).
As the survey was conducted with only insignificant deviations from the plan the WGBIFS recommends that the result from the 4 th quarter BITS survey in 2006 can be used without any restrictions by the WGBFAS (Section 5.3).
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 2007 can be used without any restrictions by the WGBFAS (Section 5.4).
RECOMMENDATION TO WKAFAB AND WGBFAS
WGBIFS recommends that conversion factor based on the net opening are suitable approximations of the conversion factors of flounder. Second option is the use of the estimated conversion factors. The reasons of the very large variability of the different estimates of conversion factors of the “Granton” gear type are unclear (Section 5.5).
WGBIFS recommends based on the available information that additional activities in relation to extend the BITS in shallower waters (10 – 20 m) will not be planned (Section 6.1).
For improving the usability of flounder data which are stored in the DATRAS system for the stock assessment it recommended by the WGBIFS that length measurements of flounder during the first quarter BITS and the registering of the results in the DATRAS database are mandatory (Section 8.2).
RECOMMENDATION TO WGBIFS – ACOUSTIC SURVEYS
The main results of both acoustic surveys in May/June and October 2007 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 coordinator (Niklas Larson , niklas.larson@fiskeriverket.se) and the BAD1 manager (Eberhard Götze , eberhard.goetze@ifh.bfa-fisch.de) <u>not later than one</u>

<p><u>month before the ICES WGBIFS meeting of the next year.</u> These results are intended for the information of the ICES Assessment Working Groups.</p>
<p>WGBIFS agreed that high ping rate (constant – 0.3 seconds between pings) will be used during the acoustic surveys in May and October. It should be pointed that the calibration of the equipments must be realized with the same ping rate.</p>
<p>WGBIFS recommends that such type of analyses should be realized until the next meeting. To realize the studies it is necessary to summarize the necessary data in one database. Following data are required for the analyses:</p> <p>Structure of required data for the analyses</p> <p>Number of fishing station</p> <p>Position of fishing station (Latitude, Longitude)</p> <p>Subdivision</p> <p>Water depth</p> <p>Depth of headline</p> <p>Vertical net opening</p> <p>total s_A Value during the fishing station</p> <p>σ_i Value of all target species, i, during the haul</p> <p>p_i Proportion of target species, i, based on number of individuals of the fishing station</p> <p>Mean s_A value of the subdivision</p> <p>Target species:</p> <p>Sprat age group 1</p> <p>Sprat age group 2+</p> <p>Herring, etc</p> <p>WGBIFS recommends that the countries prepare the necessary data of all fishing stations which were realized during the acoustic surveys in May 2003 and May 2004 and make the data available for assessing the possible effect of the proposed method in relation to the Baltic sprat stock. WGBIFS recommends that Germany realize the analyses and presents the results during the next meeting.</p> <p>To improve the quality of stock indices based on acoustic data WGBIFS, furthermore, recommended that the same data are stored and analysed for both acoustic survey in 2007. That means that only one additional activity is required, the storage of the s_A-values during the fishing stations. The other data are available based on the standard sampling. (Section 9.1)</p>
<p>The different studies of the last years clearly suggest that alternative stratification schemes of the Baltic Sea should be taken into account. Therefore, it is proposed that the “acoustic subgroup” which was established in 2006 discuss alternative types of stratifications (advantages and disadvantages) until the next meeting. The results of the discussions which incorporate the results of the studies which were recommended by WGBIFS will be presented during the next meeting (Section 9.2).</p>
<p>RECOMMENDATION TO WGBIFS – TRAWL SURVEYS</p>
<p>The WG therefore recommends that the area covered by the WGBIFS in the future is extended to include the Baltic Sea and Kattegat (3as, 3b, 3c and 3d).</p> <p>The WG therefore recommends that the “Ancylus” survey, the “Danish Sole Survey” and the “Havfisker Survey” in the future are coordinated by the WGBIFS (Section 5.1).</p>
<p>WGBIFS recommended that the same quantity of sampled data for flounders like length, age, sex, maturity, weight is required as for cod (see BITS Manual) (Section 5.3).</p>
<p>It was agreed that:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> - southern part of ICES subdivision 24 - ICES subdivision 25 - south western 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".

(Section 7.3)

The BITS manual was restructured and was reworked between the meeting in 2006 and 2007. The new version was discussed by mail and during the meeting. Some additional changes were proposed and agreed during the meeting. Furthermore, it was agreed that for the BITS the field SurTemp, BotTemp, SurSal and BotSal is defined as mandatory. That means that these data which are sampled during BITS will be regularly stored in the HH datasets by all countries beginning with BITS in autumn 2007.

Surface and bottom are defined as the upper and deepest available value in the datasets which are sent to the ICES data centre (Section 8.2)

Acoustic measurements will be carried out continuously during the total time of BITS. The settings of the acoustic equipment required for the resolution of cod are given below. To estimate the cod density in pelagic waters in areas with oxygen depletion in deep water layers, additional midwater trawls will be used to estimate the species and length composition in that areas. Comparative studies will also be made and therefore it is important that the echo sounder is set to collect high ping rate data all through the survey so that as much data as possible is collected from both oxygen depleted areas and from areas with good oxygen conditions as well as the intermediate areas.

Additional to this procedure Sweden will conduct acoustical investigations and try to describe the possible change of cod density perpendicular to the oxygen gradient, by making transects from areas with good oxygen conditions to areas in the deep basin containing the oxygen depletion zone in the centre. Several transects will be conducted back and forth trying to model a possible change in the abundance as a function of the varied oxygen, see the following Figure (Section 10.2).

Tracking will be based on raw-data sampled with a 38.0 kHz Simrad split-beam Scientific Echosounder properly calibrated at the according settings with the standard copper sphere method prior to the cruise. It is recommended that hydroacoustic data are recorded continuously during the cruise. Target-Strength (TS) data and angular position data then can be used for hydroacoustic single fish tracking (Section 10.2.3)

WGBIFS recommends that until next meeting all countries should evaluate the effort needed for checking their data and uploading possibilities (Section 11).

RECOMMENDATION TO ICES DATA CENTRE

It is required that a haul duration, HaulDuration of 0 minutes must be allowed for hauls with a validity code "N" (the oxygen content on the bottom is below the recommended minim) (Section 8.2).

The hydrographical data SurTemp, BotTemp, SurSal and BotSal have been mandatory for BITS since BITS in autumn 2007 (see table below):

SurTemp	54	4	✓	decimal1	-1.0 to 30.0	in °C
BotTemp	55	4	✓	decimal1	1.0 to 20.0	in °C
SurSal	56	5	✓	decimal2	10.0 to 38.0	in PSU
BotSal	57	5	✓	decimal2	20.0 to 38.0	in PSU