#### R1/12

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FRV Scotia

Cruise 1002S

#### **REPORT**

27 June - 17 July 2002

### **Personnel**

John Simmonds

(In charge)

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PhD Student

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## **Objectives**

To conduct an acoustic survey to estimate the abundance and distribution of herring in the north western North Sea and north of Scotland between 58-61°45'N and 4·W to 2°E, excluding Norwegian and Faroese waters.

To Obtain echosounder trace identification using pelagic trawl.

To obtain samples of herring for biological analysis, including age, length, weight, sex, maturity and ichthyophonus infection

To obtain samples of herring for genetic analysis.

To obtain photographic records for fish maturity analysis.

To obtain hydrographic data for comparison with the horizontal and vertical distribution of herring.

To obtain plankton samples for acoustic identification work.

Out-turn costs to project: 21 days MF01tb

### **Narrative**

Scotia sailed at 1300 hours on 27 June 2001 and made passage towards Sinclair Bay (Wick) which provided shelter from the strong northwesterly wind to attempt a calibration. However, the tide proved to be too strong and a calibration was not attempted. Scotia started the survey

at 0300 BST on 28 June at 58°10'N 3°14'W and followed this latitude eastwards. East/west transects were carried out at 15 n mi spacing progressing northwards. After two transects Scotia broke off the survey at 2015 on 29 June and anchored in Scapa Flow to calibrate the acoustic instruments on all scientific sounders. At 0400 on 30 June Scotia left Scapa Flow and commenced survey at 0600 BST at 58°42' N 2°52' W. The survey was carried out on east/west transects on a 15 n mi spacing progressing northwards between 2E, the Scottish mainland, and the Orkney and Shetland Islands from 0300 to 2300 BST. The cruise track is given in Figure 1. Additional short transects were added into the survey in areas of expected higher herring abundance to the east of Shetland. FRV Scotia ceased the survey at 2300 BST at 60°33'N 1°32'E) and docked in Lerwick at 0830 BST on 8 July for a mid cruise break. Scotia sailed again at 0800 BST on 9 July and recommenced the survey at 60°40'N 0°47'W at 1145 BST. FRV Scotia continued the survey north to 61°40'N and then progressed southwards to the west of Shetland carrying out 7.5 n mi spaced transects west of Shetland and finished the survey at 0600 BST on 15 July (60°03'N 1°10'W). FRV Scotia then proceeded to Sandwick Bay to carry out a second calibration of the acoustic instruments. FRV Scotia departed Sandwick Bay following successful calibration of acoustic instruments at 1400 GMT and sailed to Aberdeen and docked at 0630 BST on 17 July 2002.

### **Main Activities**

Throughout the acoustic survey acoustic data was collected using a Simrad EK500 echosounder operating at 38, 120, 200 and 18 kHz, with raw data collected using EchoView software. The data were scruitinised in board and the allocation to species carried out within Echoview.

Fishing with a PT160 midwater trawl was carried out on observed fish traces on an opportunistic basis. The locations of the trawl hauls are shown in Figure 1 and catch data summarised in Table 1, 50 trawls were taken, of which 35 contained more than 100 herring. In addition to a total of 18,442 length frequency data, herring were sampled for gonad, liver, and total weight, stomach fullness, sex, maturity, otolith and macroscopic evidence of ichthyophonus infection. Five samples of 200 fish were taken east of Shetland for HERGEN herring genetics project in addition to the routine biological samples (fin clips being taken for genetic analysis). The thermosalinograph was run throughout the cruise and a total of 18 CTD stations were carried out, (one per day at 2300 BST each night Fig. 2). A total of 45 mini-logger temperature profiles were collected-by attaching the mini-logger to most trawl hauls to provide information on temperature profiles between CTD stations.

Photographs of herring maturity stage were taken from fish at stages 2, 3, 4 and 8 selected from hauls throughout the survey area. These will be combined with additional photographs to record the 8 stage maturity key used at the Marine Laboratory.

# Results

All the survey objectives were met. The survey was completed successfully, with no time lost due to bad weather. The total mileage surveyed was approximately 2600 n mi (Fig. 1) with a total of 1016 acoustic log intervals recorded. Two successful calibrations were carried out, which gave consistent results with 1999 with a difference of less than 0.2 dB for the 38 kHz system. Calibrations on 200 and 120 kHz were carried out and agreed to a slightly lower precision. Calibration of the 18 kHz hydrographic sounder was performed with greater difficulty.

Extensive continuous medium density concentrations of herring were found North of 58°30'N to 59°00'N between 1°W and 1°E. High concentrations of herring were found east of Shetland on both sides and to the north of Poby Bank. Fishing was largely successful but marks were seen on the sounder but not caught on a few occasions. The trawl results were characterised by the very high proportion giving herring and the very low level of catch of all other species. A full stock estimate and survey report will be prepared shortly. Ichthyophonus infection within North Sea herring remains at a very low level, 5 in 3290 of the herring examined, which is similar to last year (6 of 4,531).

J Simmonds 16 August 2002

Seen in draft: P Ramsay, Master, FRV Scotia

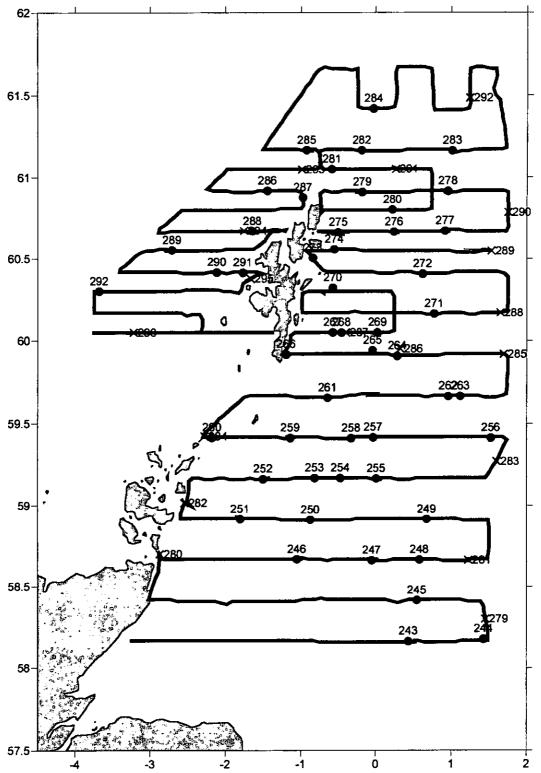


Figure 1. Cruise track FRV SCOTIA for 27 June-17 July 2002 trawl stations ( • ), CTD stations (X)

Table 1 summary of trawls hauls FRV Scotia 28 June - 17 July 2002

Haul No	Position	Est Catch (kg)	Herring	Mackerel	Sprat	Blue Whiting	Norway Pout	Haddock	Whiting	Saithe	Spurdog	Lumpsucker	Pearlsides	Sample (kg)
243	58 09.98N 0 29.30E	1500	7975				**************************************						· · ·	120
244	58 11.17N 1 27.55E	450	3540	· · · · · ·										75
245	58 25.06N 0 32.10E	120	656				4	4	3	2				90
246	58 40.13N 1 02.22W	1650	15431											52.5
247	58 39.81N 0 01.32W	1650	12540											75
248	58 39.85N 0 36.89E	600	3667	· · · ·					1	1				90
249	58 54.69N 0 38.73E	1200	6773			<del></del>								90
250	58 54.79N 0 55.32W	360	2272	1		<del> </del>			<u> </u>					90
251	58 55.008N 1 49.3W	180	2586	<u> </u>	24	<del></del>								30
252	59 09.91N 1 28.46W	750	6900											52.5
253	59 10.27N 0 46.44W	300	2900	1			3	<del></del>						60
254	59 9.996N 0 24.44W	10	96	5					<u> </u>			1		10
255	59 09.98N 0 01.72E	1500	10620	<u> </u>					<u> </u>					75
256	59 24.80N 1 29.20E	1	0					4						0
257	59 25.51N 0 02.75W	300	1913					177	87		1			90
258	59 24.73N 0 21.08W	1800	14736									<del></del>	<del></del>	75
259	59 24.86N 1 09.93W	4500	39075	<u> </u>										60
260	59 25.00N 2 11.78W	10	0				10						<del></del>	0
261	59 39.39N 0 36.51W	360	2630											75
262	59 39.92N 1 00.78E	142.5	355		1					120				52.5
263	59 40.00N 1 09.00E	0.3	0					1						0
264	59 54.52N 0 13.56E	30	27			•		12						30
265	59 57.99N 0 06.03W	10	65					3					1	10
266	59 55.03N 1 12.12W	25	171				5600		1					17
267	60 02.95N 0 29.98W	10	0					12	7	-				10
268	60 02.88N 0 25.18W	25	18					17	9		<u> </u>			25
269	60 02.79N 0 04.40E	105	755	<u> </u>										75
270	60 20.71N 0 32.22W	240	1245	† <del></del> -		<del></del>		<del> </del>	<b>†</b>		<u> </u>			90
271	60 09.83N 0 48.07E	1500	9160											75
272	60 24.49N 0 36.78E	4500	26820					,					<u> </u>	75
273	60 30.98N 0 51.73W	1350	8406					1	1					75
274	60 33.16N 0 33.17W	1500	10025						<u> </u>					75
275	60 39.65N 0 27.93W	30	129											30
276	60 40.05N 0 15.57E	1650	8305											90
277	60 40.32N 0 55.97E	900	4700					1	1	1				90
278	60 55.18N 0 54.23E	600	2773	T		<del> </del>		<del>                                     </del>	<del>                                     </del>	<del> </del>				90

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Haul No	Position	Est Catch (kg)	Herring	Mackerel	Sprat	Blue Whiting	Norway Pout	Haddock	Whiting	Saithe	Spurdog	Lumpsucker	Pearlsides	Sample (kg)
279	60 54.73N 0 12.96W	90	308											90
280	60 48.19N 0 15.87E	300	1450											90
281	61 3.11N 0 39.28W	105	406	-										90
282	61 9.78N 0 10.52W	90	374			<del></del>				<del></del>				90
283	61 09.94N 1 00.72E	1800	8740											90
284	61 25.13N 0 04.17W	45	184		<del></del>					3			meshed	45
285	61 09.79N 0 53.04W	257	109			9	189	5	7					75
286	60 54.97N 1 24.33W	120	669											75
287	60 52.15N 0 57.64W	900	4150	540										90
288	60 40.09N 1 36.30W	600	2873	220										82
289	60 33.23N 2 42.34W	180	810	22										90
290	60 25.04N 2 05.87W	1500	8067											90
291	60 24.90N 1 44.94W	0	0							126	1	1	1	0
292	60 18.06N 3 41.80W	2	10			<u> </u>								2

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