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FRV *Scotia*

Cruise 1002S

## REPORT

27 June - 17 July 2002

### Personnel

John Simmonds	(In charge)
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Emma Hatfield	
Stuart Halewood	
Stephen Keltz	
Rob Watret	
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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 scrutinised 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 ichthyophonous 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. Ichthyophonous 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*

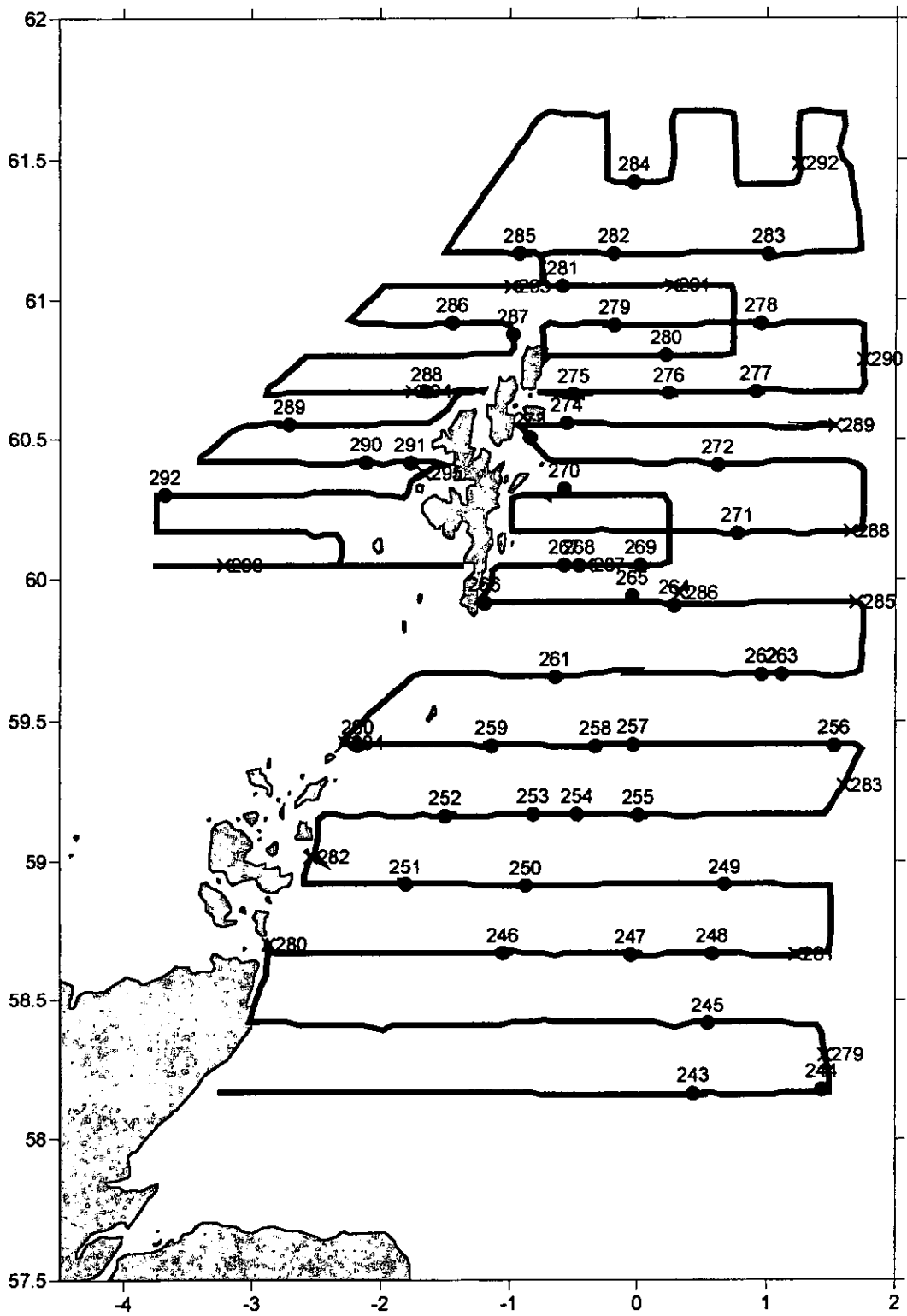


Figure 1. Cruise track FRV SCOTIA for 27 June-17 July 2002 trawl stations (•), CTD stations (X)



