DEPARTMENT OF AGRICULTURE FOR N. IRELAND
AGRICULTURAL AND ENVIRONMENTAL SCIENCES DIVISION

CRUISE REPORT: CRUISE LF/23/95: DOUGLAS BANK HERRING SURVEY

VESSEL: R.V. *Lough Foyle* (DANI)

DATES: 23 - 25 October 1995

AREA OF OPERATION: Irish Sea (North); ICES Division VIIa

TYPE OF SURVEY: Acoustics / midwater trawling

PERSONNEL:

M. Armstrong	SSO	(DANI; S.I.C.)
M. Dickey-Collas	HSO	(DANI)
M. McAliskey	SO	(DANI)
C. Reavey	SO	(DANI)
J. Peel	ASO	(DANI)

OBJECTIVE

To assess the distribution, biomass and age-composition of herring on the Douglas Bank spawning grounds at the end of the spawning season.

METHODS

A sphere-calibrated Simrad EK-500 echosounder with a 38 kHz split-beam transducer mounted in a towed body were employed to carry out echo integrations along transects off the east coast of the Isle of Man (Figs 1a and 1b). Calibration data collected during cruise LF1895 (September 1995) were used. The survey grid was designed on the basis of the results of a larger scale survey of the area to the east of the Isle of Man during 18-19 October, carried out by four commercial trawlers chartered by DANI. This showed the herring stock to be largely confined to an area 2 to 4 miles offshore between Douglas and Santon Head, where gravel spawning beds are located.

A Maritin 54m x 47m midwater trawl, fitted with a 20-mm stretched-mesh liner and a Furuno netsonde, was deployed once to identify acoustic targets (sea conditions were mostly too rough for safe deployment of the net).

CRUISE NARRATIVE

The vessel departed Belfast at 10h.00 on Monday 23 October and proceeded to Laxey Bay on the east coast of the Isle of Man. A grid of 10 transects was surveyed southwards from 21h.00 in strong (force 7-8) SE winds (Fig. 1a). The area was then re-surveyed northwards on 10 additional transects, finishing at approx. 09h.30 on 24 October. Due to worsening sea conditions, the vessel then proceeded to the inshore region off the NW coast of the Isle of Man, where shelter was sought from force 7-9 SE winds. The vessel remained in shelter until approximately 20h.00. An easing of the weather conditions allowed the commencement of a more intensive survey of the spawning grounds off Douglas, commencing at 04h54 on 25 October (Fig. 1b). The survey was interrupted at 07h.30 to trawl on large herring targets. The grid was terminated at 12h.55 due to worsening sea conditions. The vessel then berthed briefly at Douglas at 13h.35 to offload frozen samples for Port Erin Marine Laboratory, before returning to Belfast.

WORK COMPLETED

Echo integration
The 38 kHz echosounder was run continuously during the survey at the settings given in Table 1. Data were captured using the EP-500 software and were backed up on digital audio tapes.

Target identification and biological analysis
One midwater trawl tow was completed for identification of acoustic targets. The trawl position is shown on Figure 1b. Details of the tow are given in Table 2. Species composition and length frequencies were recorded, and 45 herring were sampled for length, weight, age, maturity and vertebral count.

RESULTS

Adult herring were concentrated mainly on the spawning grounds between Santon Head and Douglas Bay (Figs 1a and 1b), in the same region where herring were found during the previous week's survey using commercial trawlers. On the first survey grid (Fig. 1a), herring were observed mainly near the sea bed in small, loose aggregations, with two large aggregations typical of spawning fish also detected. A different pattern of behaviour was recorded on the second grid (Fig. 1b) were the herring were mostly in dense schools in midwater. A large number of fish schools considered most likely to be sprat were observed off Ramsey Bay, as also recorded during the September 1995 acoustic survey (LF1895) where the schools were identified by trawling.

Analysis of the echo-integration data collected during the survey will provide estimates of biomass for herring, as part of an in-depth study of Manx herring being carried out jointly in 1995 between DANI and the Port Erin Marine Laboratory, with assistance from the NI Fishing Industry.

ACKNOWLEDGEMENTS

The Ship's personnel are thanked for their cooperation and service during this cruise. The scientific personnel are also thanked for keeping going under very arduous conditions.

Signed:

Scientist in charge..... MJ Armstrong **date**..... 25/10/95

Ships master..... **date**..... 25 x 95

VTSO
Division Head..... S J Kennedy **date**..... 8.11.95

Table 1 EK-500 instrument settings used during cruise LF2395

Transducer	ES38B	ES120-7
Frequency	38 kHz	120 kHz
(1) TRANSCEIVER MENU		(not used)
Absorption coefficient	10 dB/km	
Pulse length	Medium (1.0 ms)	
Bandwidth	Wide	
Max. power	2000 W	
Angle sensitivity	21.9	
2-way beam angle	-21.2 dB	
Sv transducer gain	26.6 dB	
TS transducer gain	27.0 dB	
3 dB beamwidth	6.6 dg	
Alongship offset	0.0 dg	
Athwartship offset	0.0 dg	

(2) OTHER SETTINGS	
Operation menu:	Ping rate = 0.5s (50m range)
Log menu:	Mode = ping based Ping interval = 1800 (50m range)
Layer menu:	Super-layer = 9 - 100
Printer / EP-500 settings:	Sv colour min. = -70 dB TS colour min. = -50 dB
TS detection menu:	TS min. = -50 dB Min. echo length = 0.8 Max. echo length = 1.3 Max. gain compensation = 3.0 dB Max. phase deviation = 4.0 dB
Bottom detection menu:	Minimum level = -50 dB, increased to -30 dB for second grid.

Table 2 Details of trawl catches taken during cruise LF2395

Tow	Date	Shooting details: Time	Lat.	Long.	depth (m)	Total catch kg.	percentage composition by weight: sprat	herring	mackerel	gadoids	other
1	25 Oct.	09h.02	54, 07.1	4, 23.7	33	10	0.3	71.8	5.0	0.5	22.4

Length frequency of herring: tow 1

Length class	Number
22.0	1
22.5	0
23.0	2
23.5	2
24.0	4
24.5	1
25.0	1
25.5	2
26.0	4
26.5	4
27.0	6
27.5	2
28.0	6
28.5	3
29.0	3
29.5	3
30.0	1
mean length	26.6 cm
mean weight	0.160 kg

Maturity stage distribution: tow 1

	Male	Female
Stage 5 (ripe)	1	1
Stage 6 (spawning)	18	15
Stage 7 (spent)	7	3

530

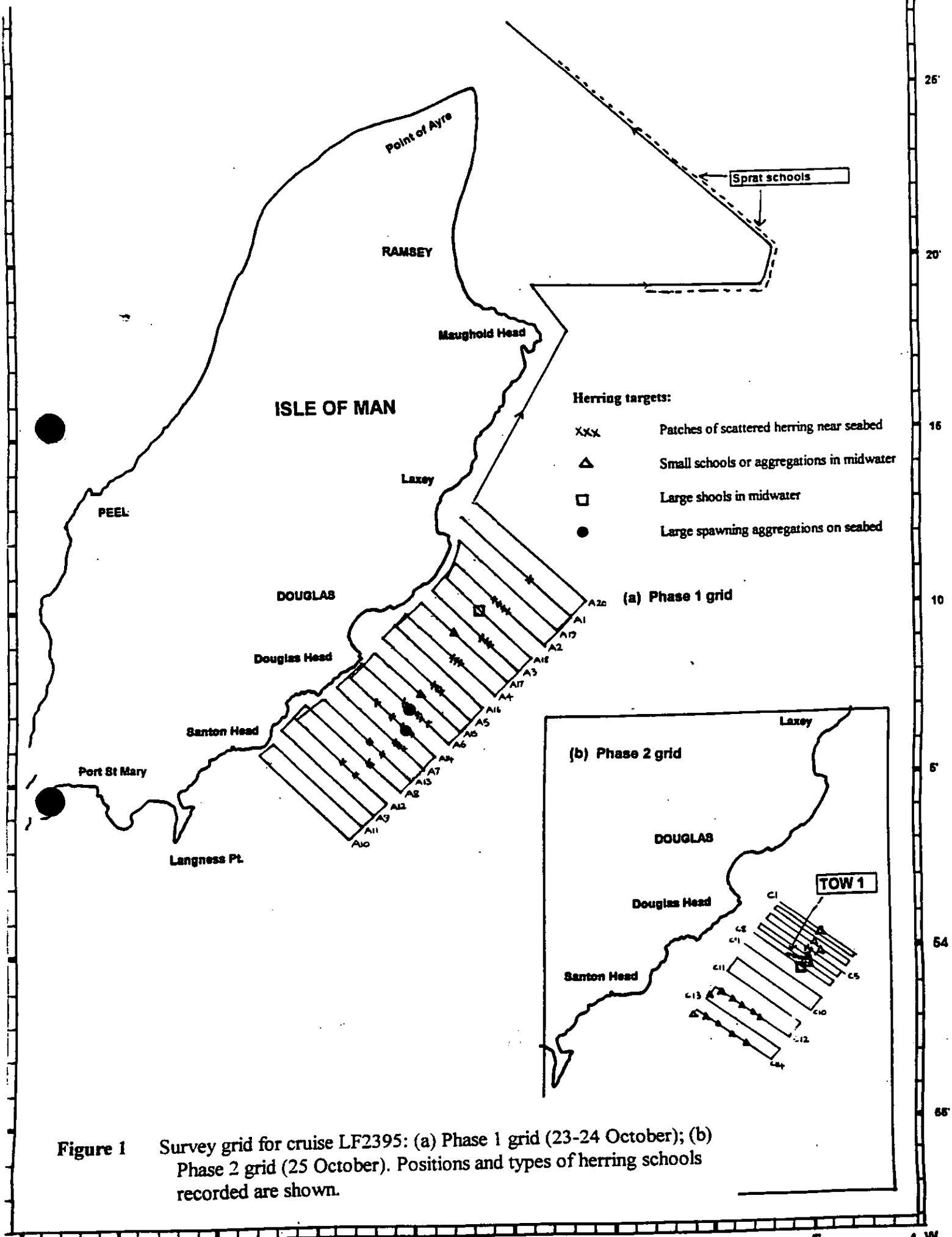

Figure 1 Survey grid for cruise LF2395: (a) Phase 1 grid (23-24 October); (b) Phase 2 grid (25 October). Positions and types of herring schools recorded are shown.