

Department of Agriculture for Northern Ireland  
Agriculture and Environmental Science Division

**Cruise Report:** LF2895 Larval Herring Survey

**Vessel:** RV *Lough Foyle*

**Dates & area:** 26-29 November 1995 in the Irish Sea (north); ICES div. VIIa

<b>Personnel:</b>	Mark Dickey-Collas	DANI	SIC/HSO
	Willie McCurdy	DANI	SSO
	John Peel	DANI	ASO
	Michael McAliskey	DANI	SO
	Chris Burns	DANI	SO
	Philippe MacClenahan	U Ulster	PhD stud

**Objectives:**

1. To survey the distribution and abundance of herring larval from the Manx and Mourne Irish Sea stocks, to produce a larval production estimate (index) and provide data on larval drift.
2. To investigate the abundance of euphausiids and other macro zooplankton in the Irish Sea.

**Cruise narrative**

Sunday 26 November 1995

All scientific crew were onboard by 08:00, and the ship sailed for station 1 at 09:00 (Figure 1). A full safety drill and demonstration was carried out. The ship headed into the eastern Irish Sea. Hauls 1 to 9 were taken.

Monday 27 November 1995

Due to bad weather the progress was slow, however a further 16 samples were taken.

Tuesday 28 November 1995

Work continued at a very slow rate, however sampling in the eastern Irish Sea was completed and the ship worked its way to the Irish coast. Hauls 26 to 41 were made.

Wednesday 29 November 1994

The grid was completed in strong south-easterly winds. The ship headed for Belfast at 14:50 and docked at 19:00.

### Methods

At each station the high speed plankton sampler was deployed to 4m off the sea bed. The temperature and salinity of the water column was monitored with the Pronet system. The plankton samples were sorted and all the fish removed and identified. The herring larvae were measured to the nearest 0.1mm and then fixed in 99% ethanol. The length frequencies of herring larvae at each station were adjusted to give numbers per m<sup>2</sup>, and then used to back calculate a larval abundance index, using a growth rate of 0.35mm per day and a mortality rate of 0.14.

The remaining macrozooplankton were sorted from the plankton samples, identified and weighed to the nearest 0.1g, and then returned to the main sample. The plankton samples were then fixed in 4% buffered formaldehyde and stored.

### Results

Over 6 million litres of sea water were sampled during the cruise. No herring larvae were found in the southern or western part of the survey area (Figure 2). There was no evidence of Mourne larvae in the survey area. As in previous years the Manx larvae had drifted north to the Scottish coast. The larvae of the transparent goby *Aphia minuta* (Risso) were more locally common than herring (Figure 3).

The numbers of herring larvae caught were very low and a very poor length frequency was produced (Figure 4). However it appears that the peak of spawning occurred between 22 September and 5 October, and ceased by 25 October (Figure 5). Although the quality of the larval abundance index is poor, the index suggests that the spawning biomass was 3.5 times smaller than that of 1994 (Figure 6).

Euphausiids, arrow worms and large copepods dominated the zooplankton. The euphausiid abundances were lower than in 1994 (Figure 7). Their distribution appeared to have shifted west towards the Irish coast, apparently influenced by the strong easterly winds. Ctenophores were only found along the English coast (Figure 8).

The water temperature was very similar to that of 1994, with the deep western waters being 12-13°C and the coastal waters 10-11°C (Figure 9). However the area was

much more saline than in 1994, approximately 0.4 parts per thousand (Figure 10). There was a large area of water with salinity  $>34.5\text{‰}$  in the western Irish Sea.

### Discussion

It is apparent that the survey was carried out too late in the year (two weeks later than in 1994). The larval herring catches were too low to make a reasonable estimate of the larval production, and net avoidance was likely as the larvae were so large. The failure to detect any Mourne spawning suggests that either the spawning stock is too small to produce a measurable result by this method, or the survey was too late in the year to catch the larvae. The larvae could have drifted out of the survey region, or had such a high mortality that numbers were too low by late November.

### Acknowledgements

The presence of south easterly winds throughout the cruise ensured that progress was slow and very unpleasant. Yet the survey grid was fully sampled. The same surveys, in 1993 and 1994, were not completed. Therefore the officers and crew of the RV *Lough Foyle* must be thanked for their outstanding effort. The commitment and ardour of the scientific team must be commended. They worked and rested in difficult conditions and still maintained their normal high standards of productivity. Their team work and efficiency was crucial to the success of the cruise. I would particularly like to thank John McCormick for the advice and guidance that I have received on all our cruises. I wish him a very pleasant and enjoyable retirement.

Signed

SIC: Mark Gallos

Date: 6 / 12 / 95

Master:

*J. McCormick*

Date: 29-11-95

4756 Division Head:

*S. J. Heaney*

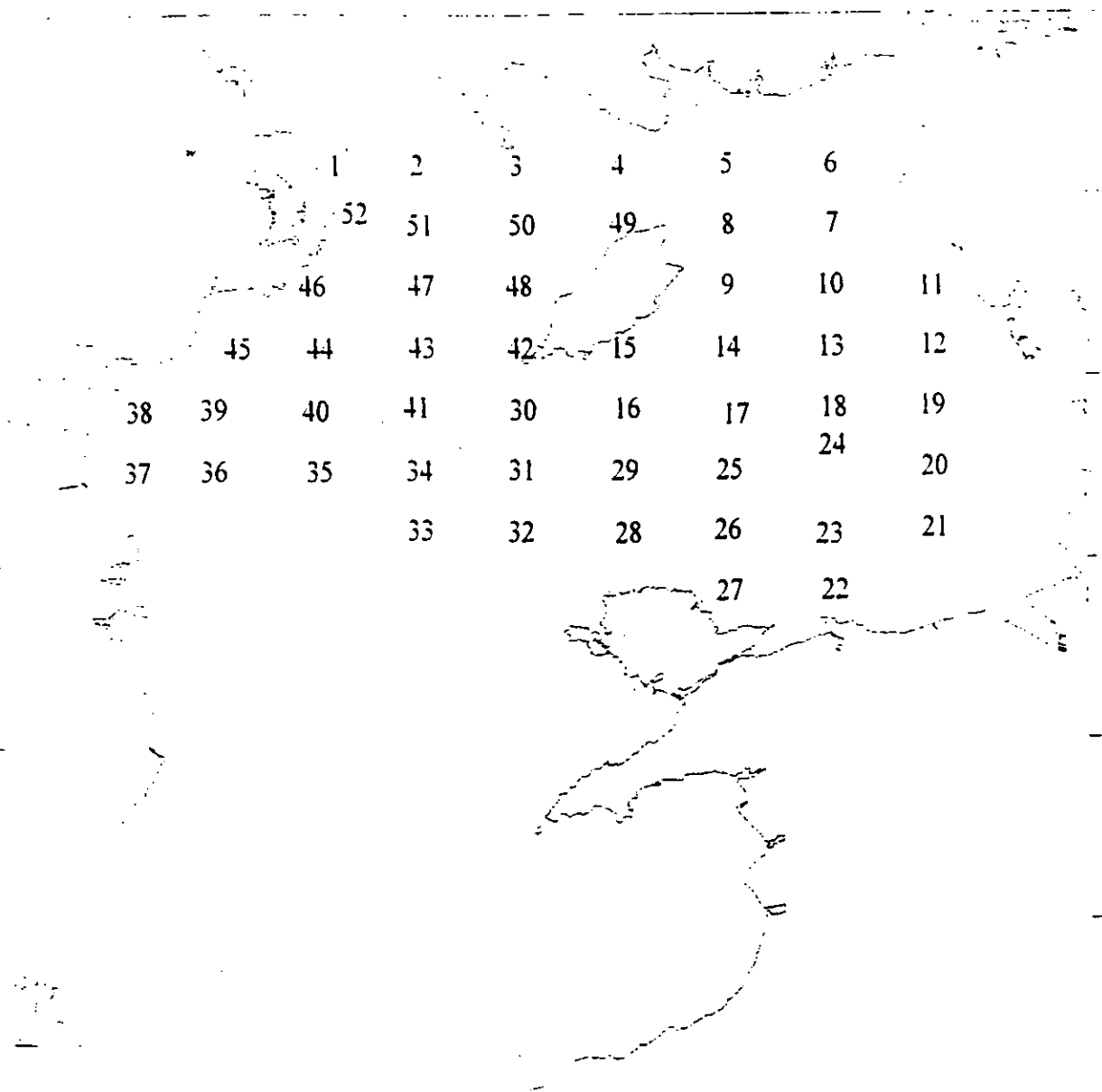
Date: 7.11.95

55°00'

54°00'

53°00'

52°00'



		1	2	3	4	5	6		
		52	51	50	49	8	7		
		46	47	48		9	10	11	
		45	44	43	42	15	14	13	12
	38	39	40	41	30	16	17	18	19
	37	36	35	34	31	29	25	24	20
				33	32	28	26	23	21
						27	22		

Figure - - - - - made during 4/7/55

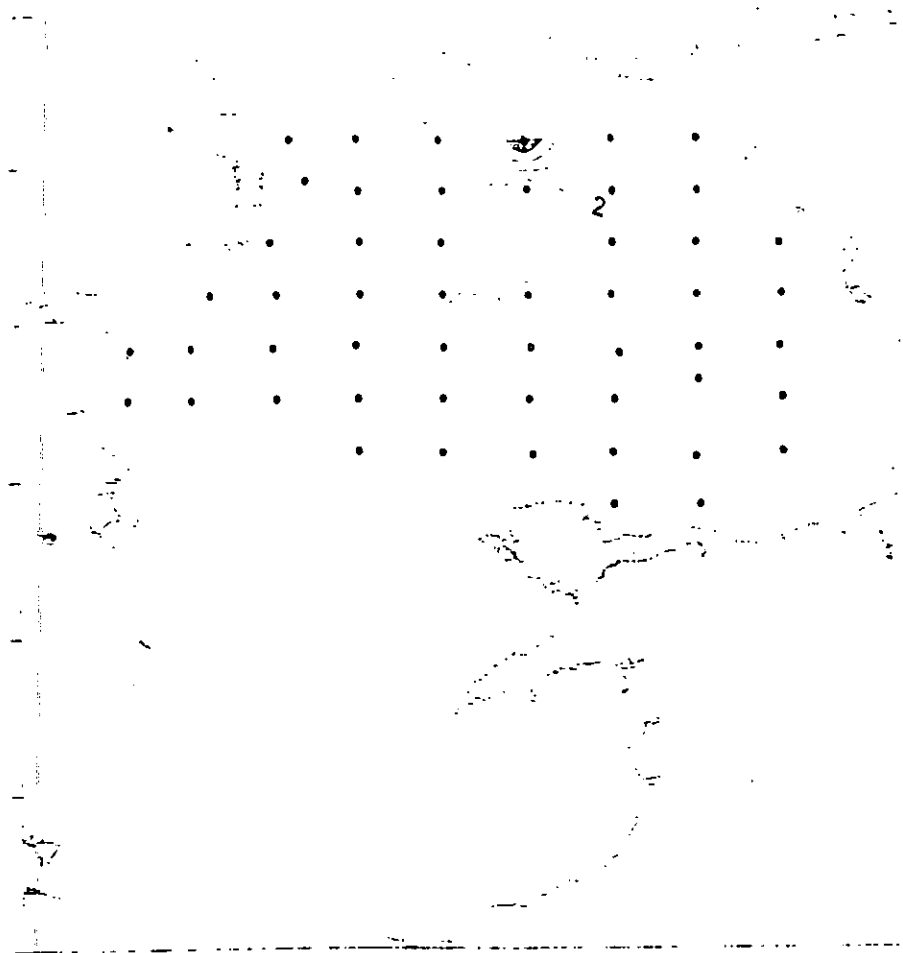
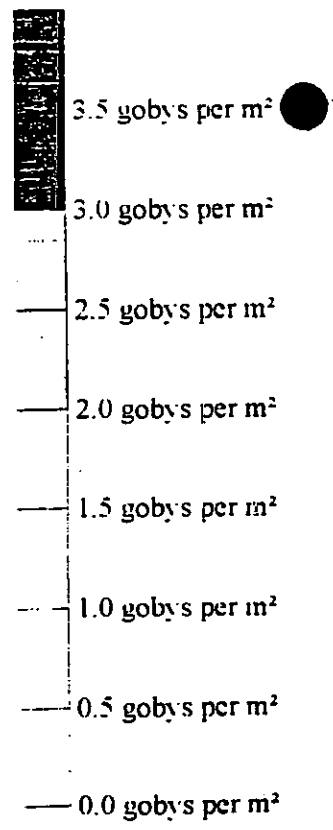
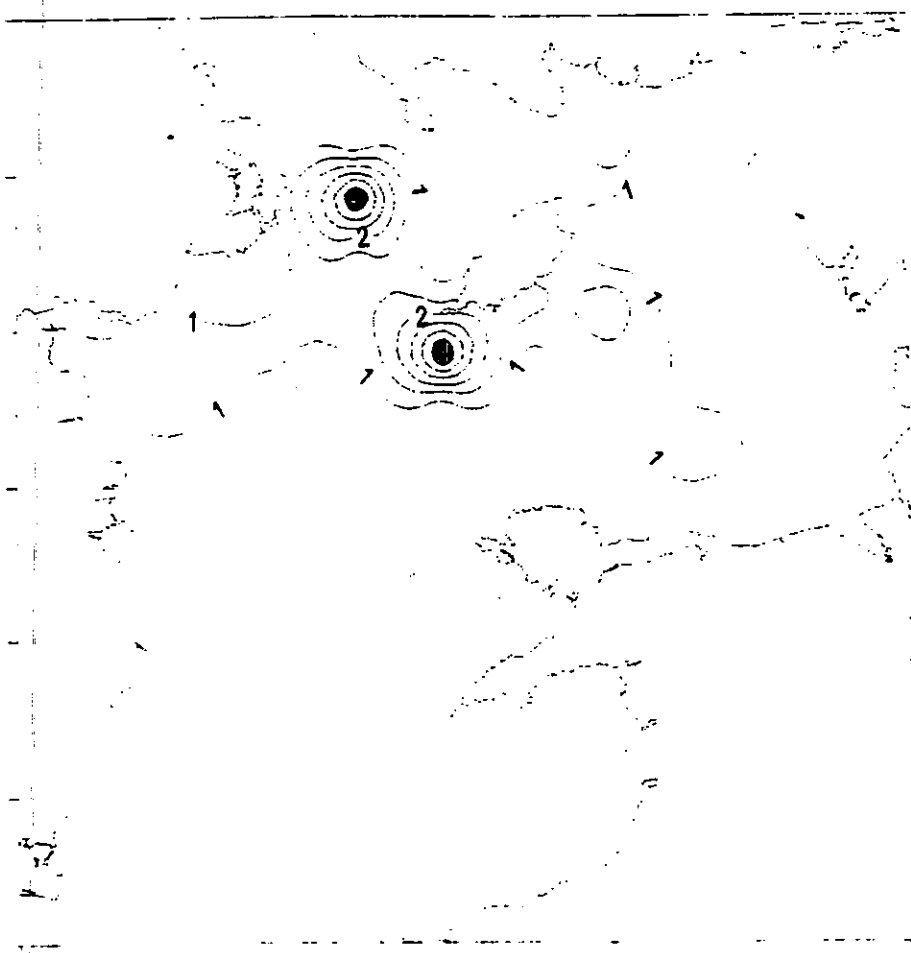


Fig 2 Abundance of herring larvae per m<sup>2</sup>

Fig 3 Abundance of transparent gobys on LF2895



537

Figure 4 Length frequency and larvae abundance index of Manx herring larvae, LF2895

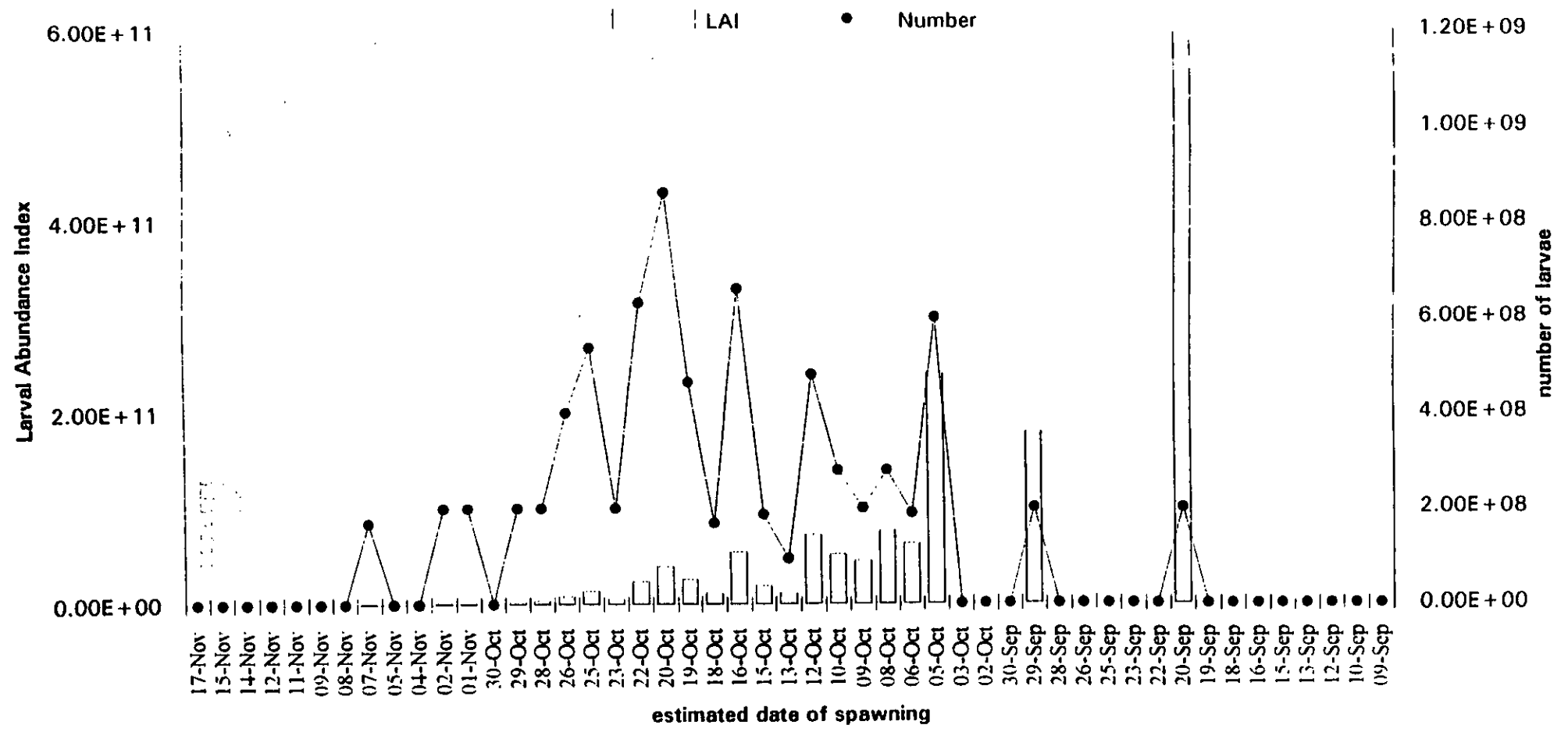


Figure 5 Manx larval herring production from 1993 to 1995

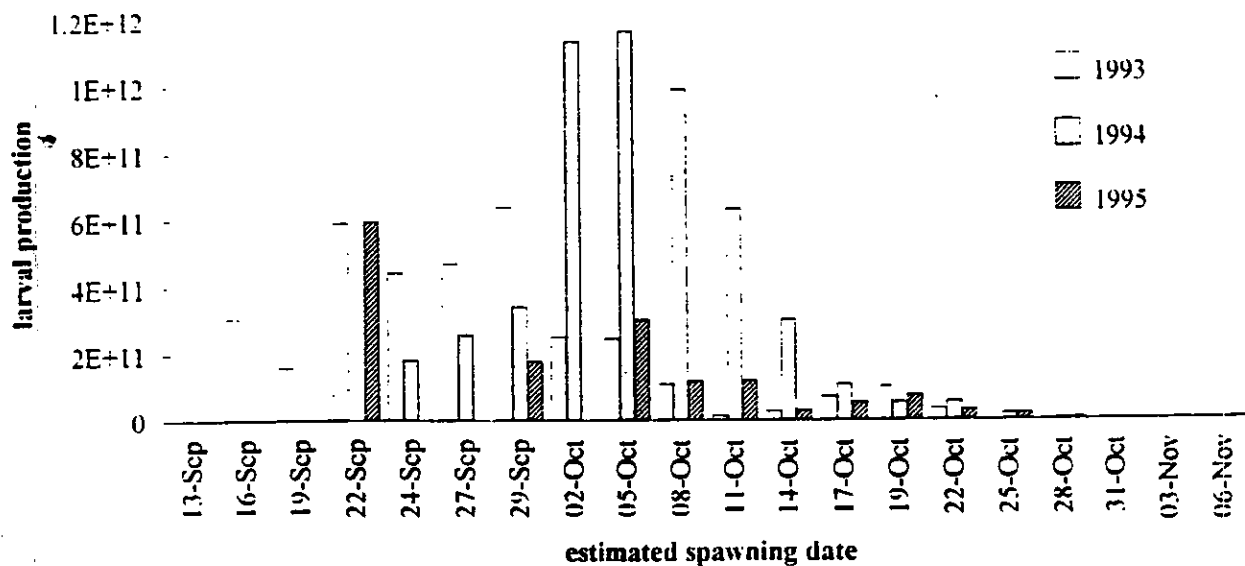
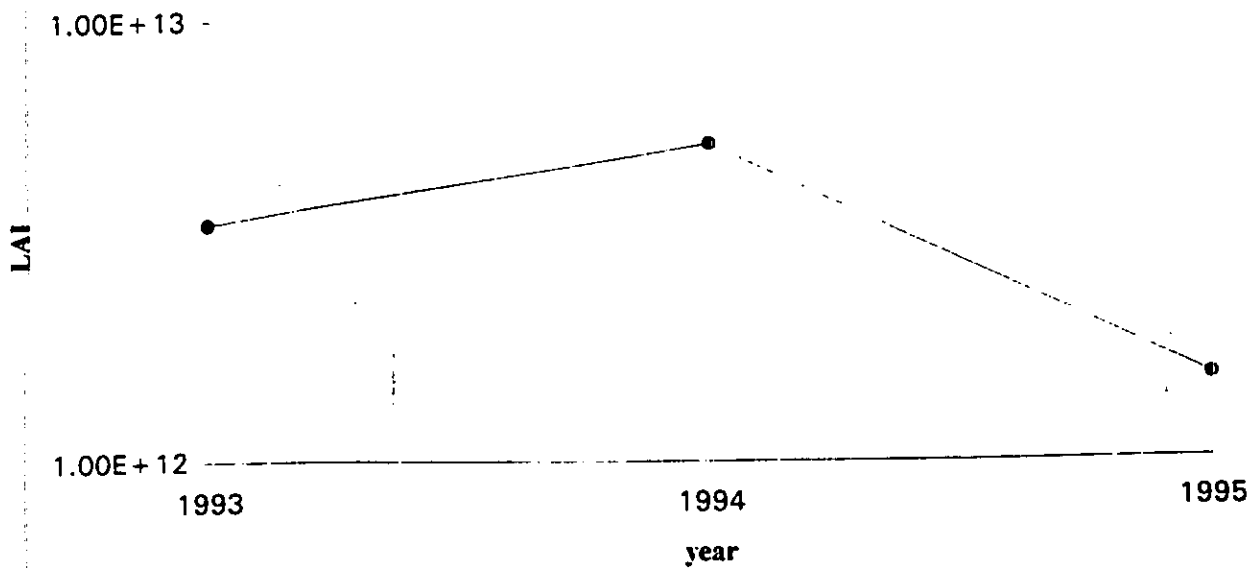


Figure 6 Larval Abundance Index (LAI) for Manx Herring 1993-1995



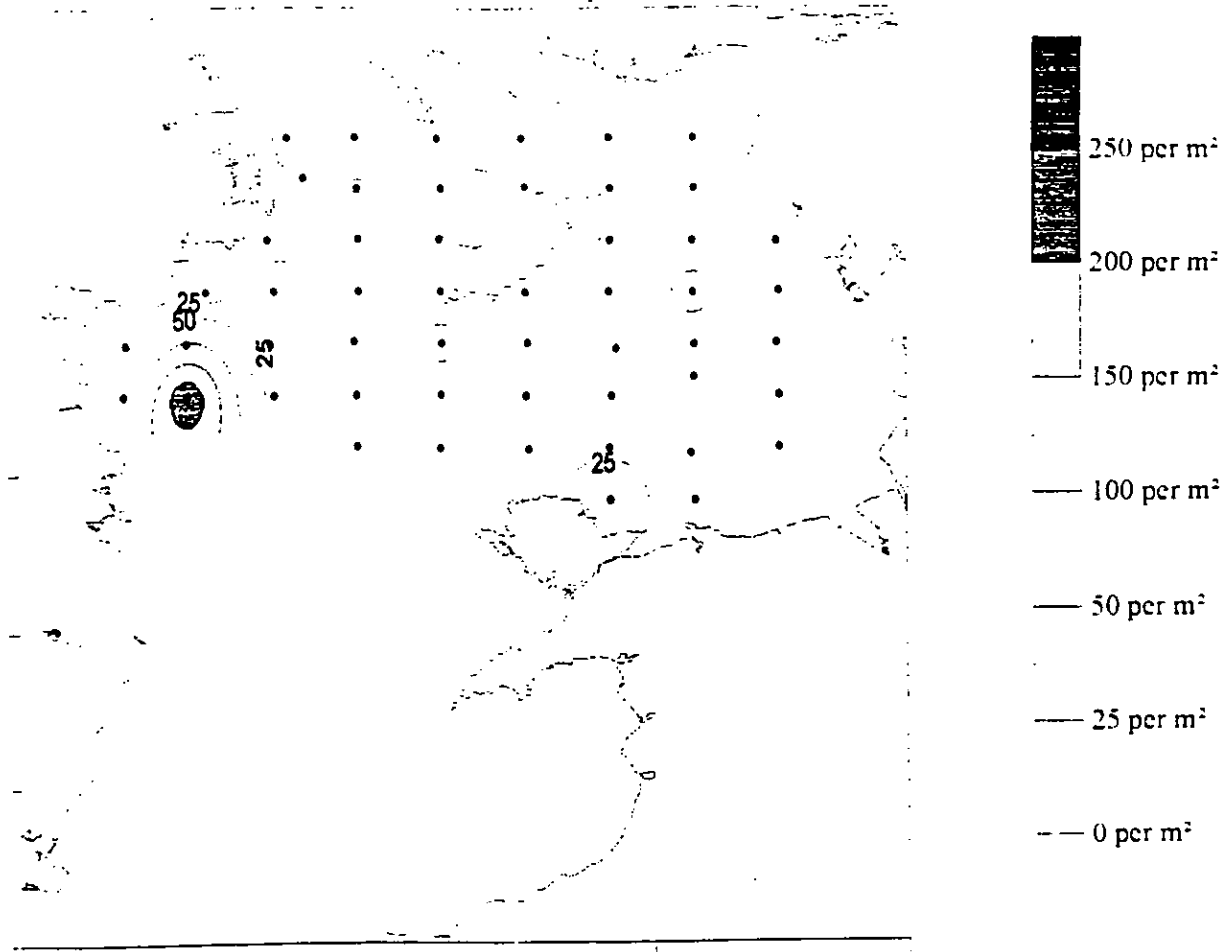
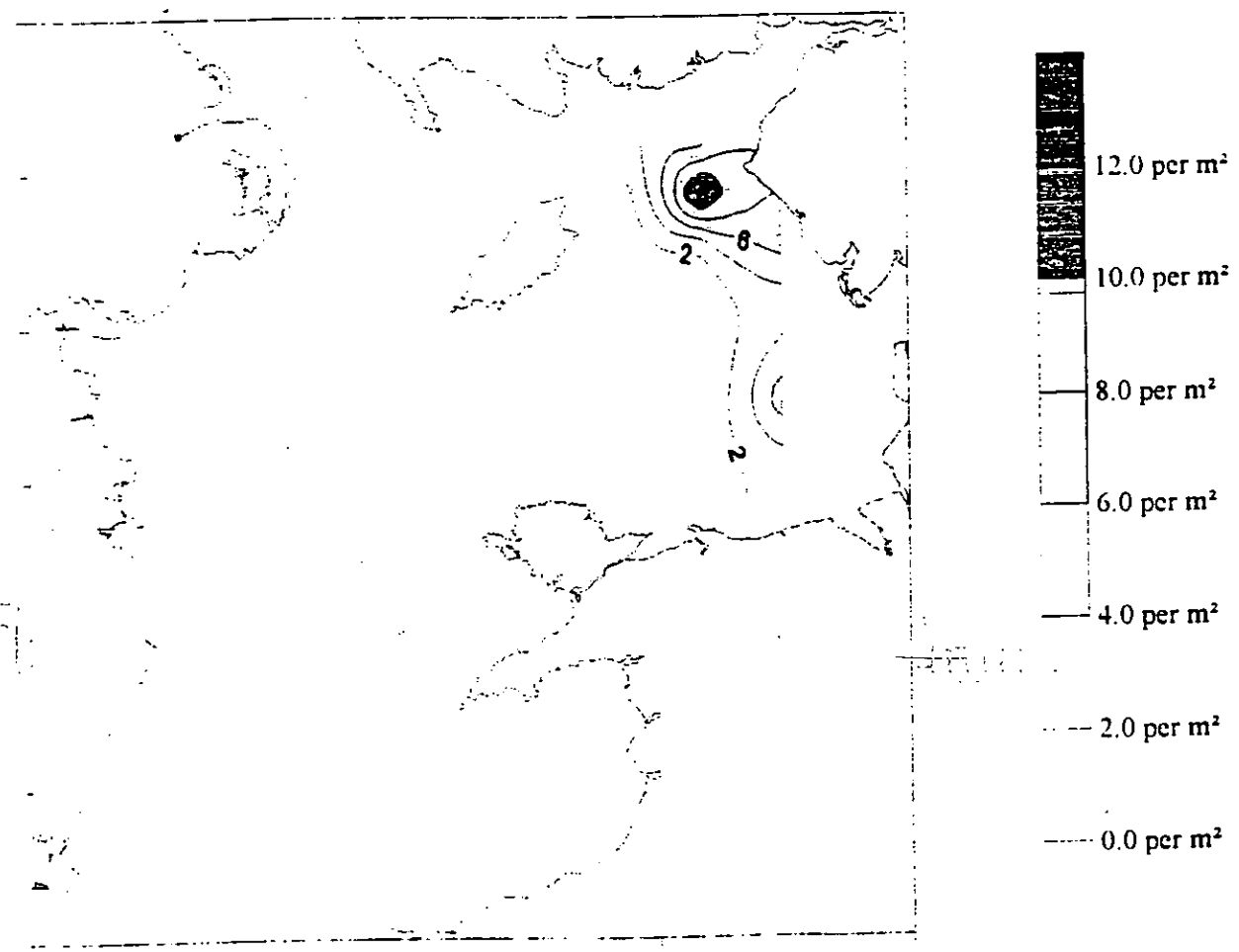


Fig. 7 Euphausiids per m<sup>2</sup> on LF2895

Fig. 8 Ctenophores per m<sup>2</sup> on LF3295





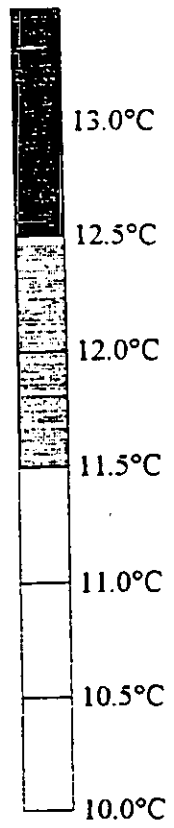
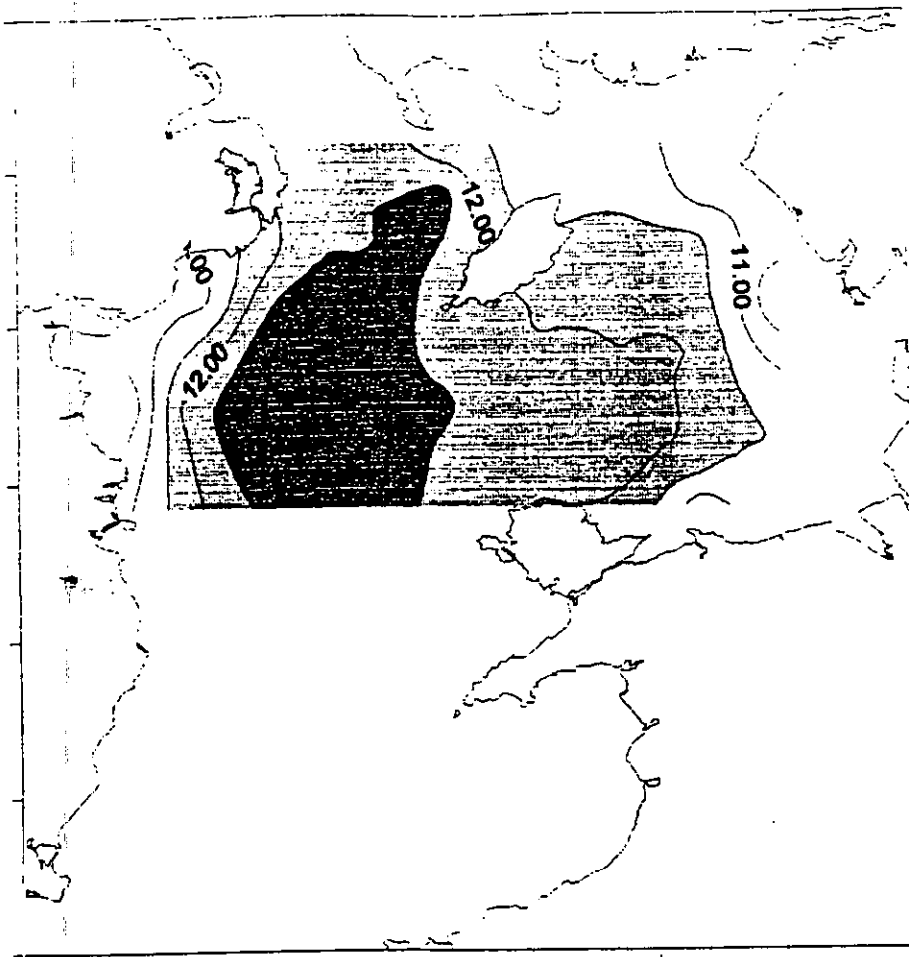


Fig 9 Water column temperature on LF2895

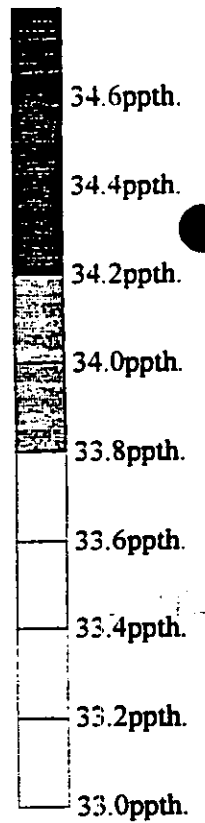
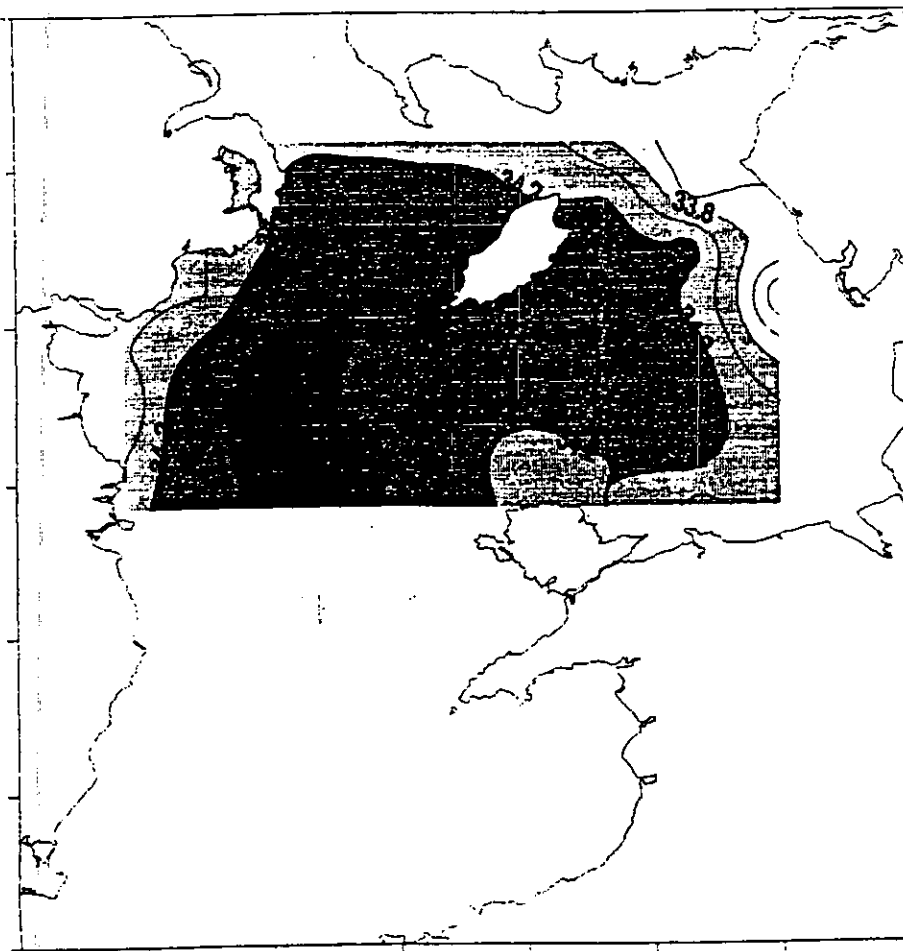


Fig 10 Water salinity on LF2895