

**CRUISE REPORT: LF/36/99: PELAGIC FISH ACOUSTIC SURVEY**

**VESSEL:** R.V. *Lough Foyle* (DANI) **DATES:** 6 - 17 September 1998

**AREA OF OPERATION:** Irish Sea ; ICES Division VIIa

**TYPE OF SURVEY:** Acoustics / midwater trawling

<b>PERSONNEL:</b>	M. Armstrong	(DANI; S.I.C.)
	W. Clarke	(DANI) <sup>1</sup>
	M. Dickey-Collas	(DANI)
	M. McAliskey	(DANI)
	M. Allen	(DANI) <sup>2</sup>
	C. Burns	(DANI) <sup>2</sup>
	H. Gerritsen	(QUB) <sup>1</sup>
	A. Orr	(Industry observer) <sup>2</sup>

<sup>1</sup> 5-10 September; <sup>2</sup> 12 - 17 September

**OBJECTIVES**

1. To estimate the biomass and population structure of herring and sprat

**METHODS**

A sphere-calibrated Simrad EK-500 acoustic system with 38 kHz split-beam transducer mounted in a towed body was employed to carry out echo integrations along transects in the Irish Sea. The 120 kHz sounder was not used because of damage to the transducer cable. Instrument settings used during the survey are given in Table 1. Acoustic and navigation data were logged and monitored using the new Echolog and Echoview software. Targets were identified by means of aimed tows of a Maritin 54m x 47m midwater trawl fitted with a 20-mm stretched-mesh liner and a Furuno netsonde. Species compositions and length frequencies were recorded from all trawl catches. Subsamples of up to 50 herring were taken from each catch for recording of age and other biological parameters. Length-weight parameters were estimated for fish species contributing significantly to the acoustic integrals. Samples of juvenile herring were frozen for a university project on otolith chemical structure. Surface temperature and salinity were measured by the thermosalinograph and logged on computer at 5-minute intervals together with position.

**CRUISE NARRATIVE**

The vessel departed Belfast at 21h.45 on Sunday 5 September. The first phase of the survey commenced on Monday morning at 08h.15 at transect 66 and terminated at transect 94 on 9 September after which the vessel was returned to Belfast for urgent repairs to be carried out on a transformer. Bad weather resulted in suspension of work from 15h.15 on 8 September to 07h.00 on 9 September, during which time the vessel lay at anchor off North Wales.

Distribution of juvenile (<15cm) cod per 3 nautical miles

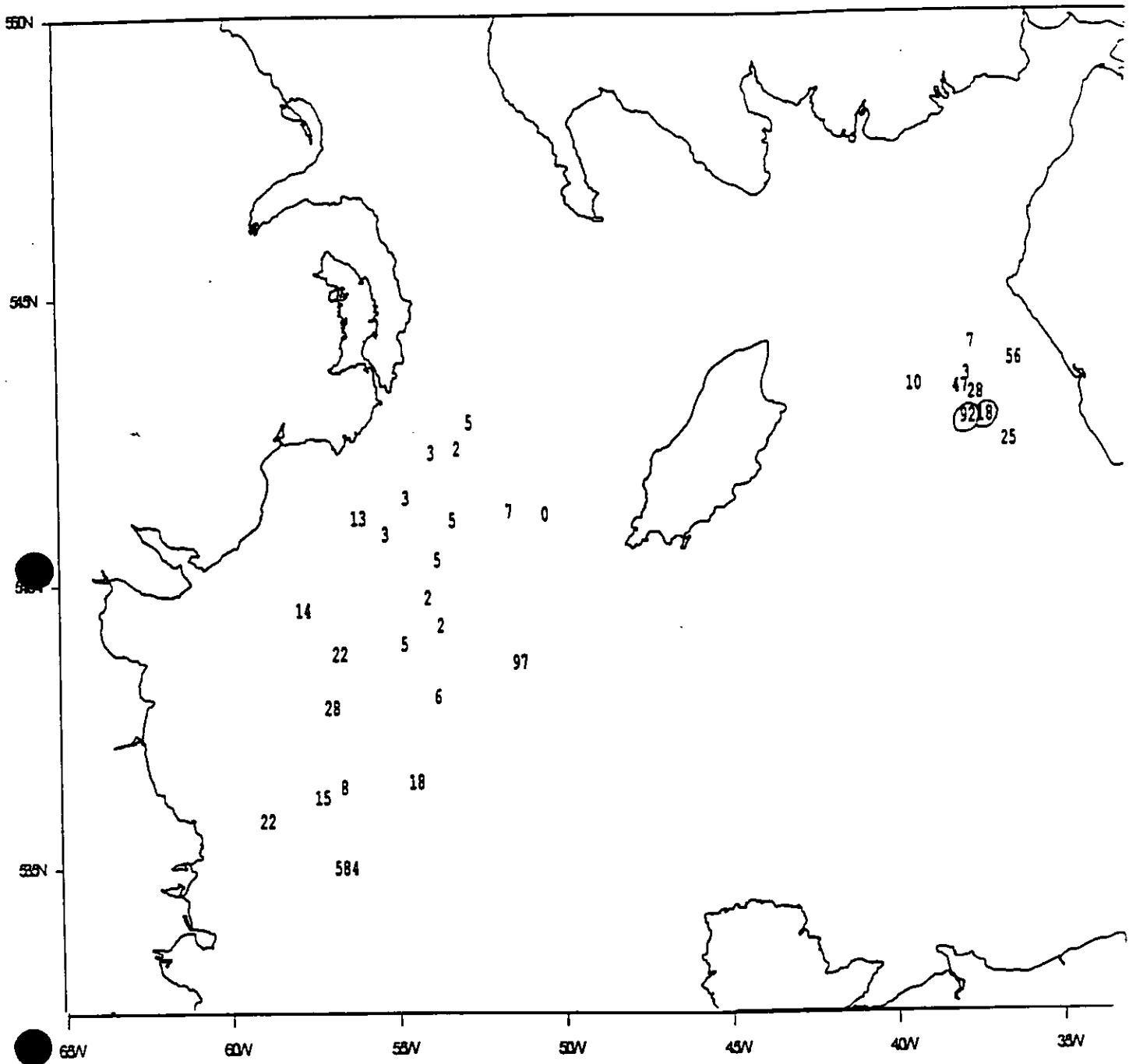
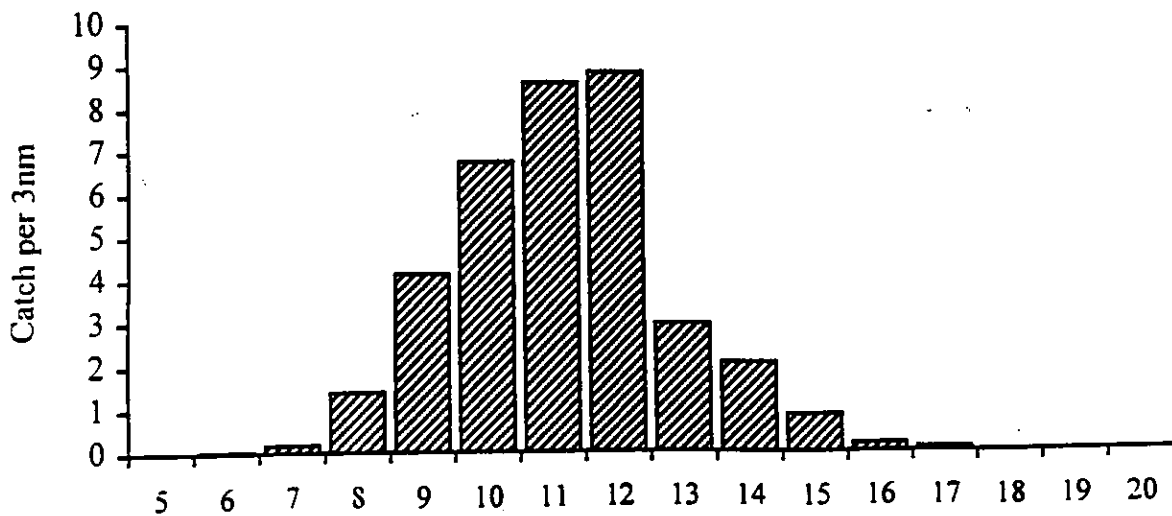


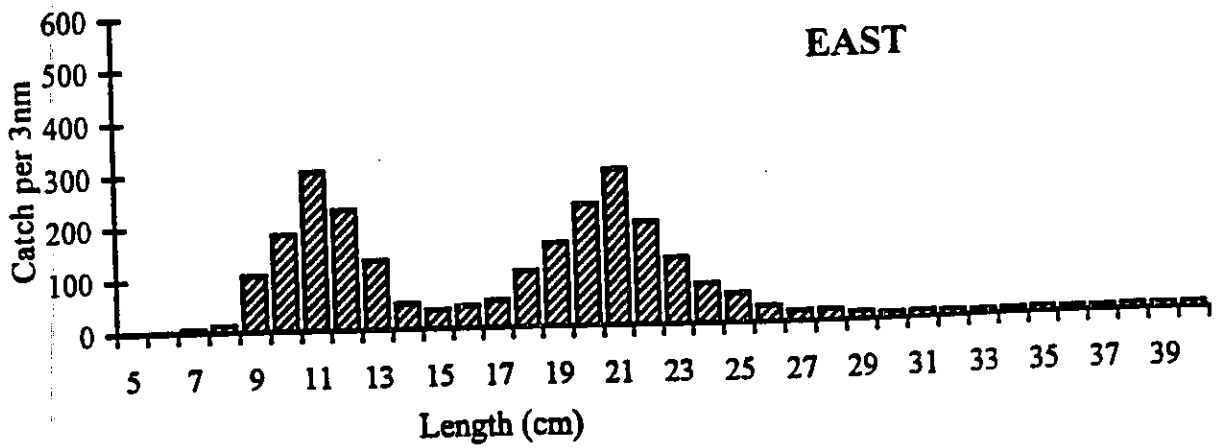
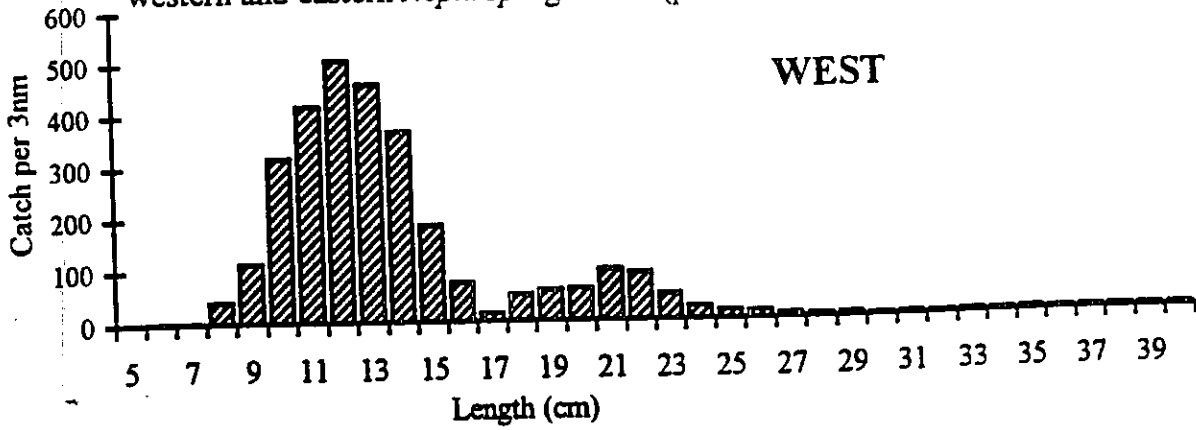
Figure 5

Mean juvenile (<20cm)cod catch per 3 nautical miles



**Figure 2**

Mean whiting catch at Length per 3 nautical miles from western and eastern *Nephrops* grounds (pooled data from all tows)



**Figure 3**

Mean juvenile (<25cm) haddock catch at length per 3 nautical miles (pooled data)

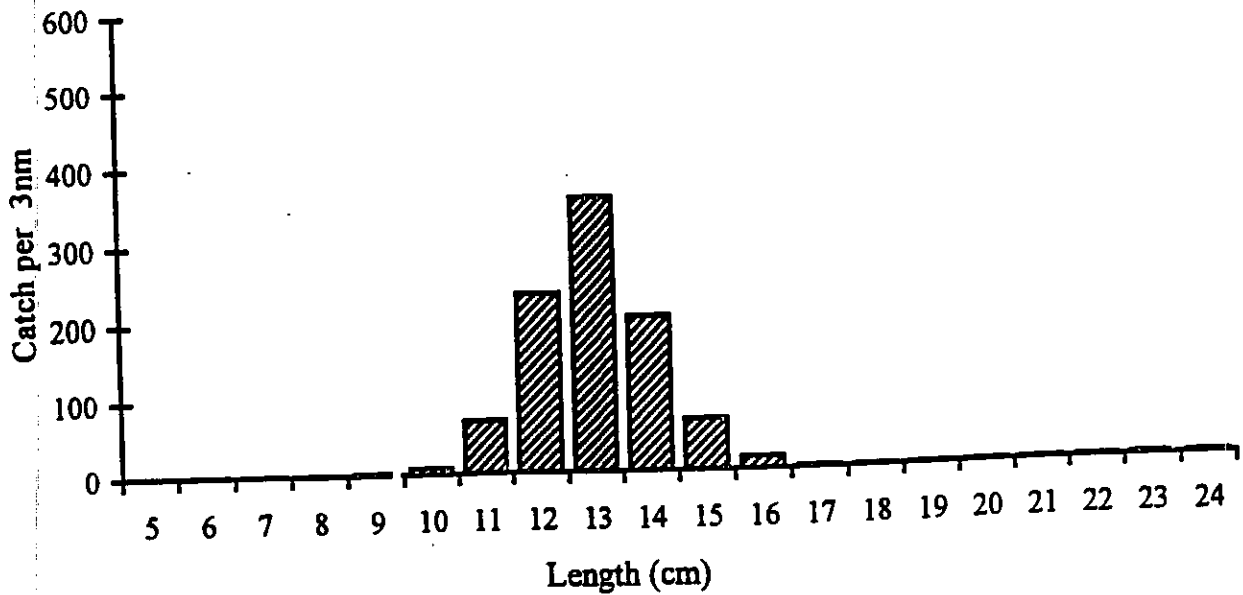


Figure 1

Irish Sea Nephrops Grounds

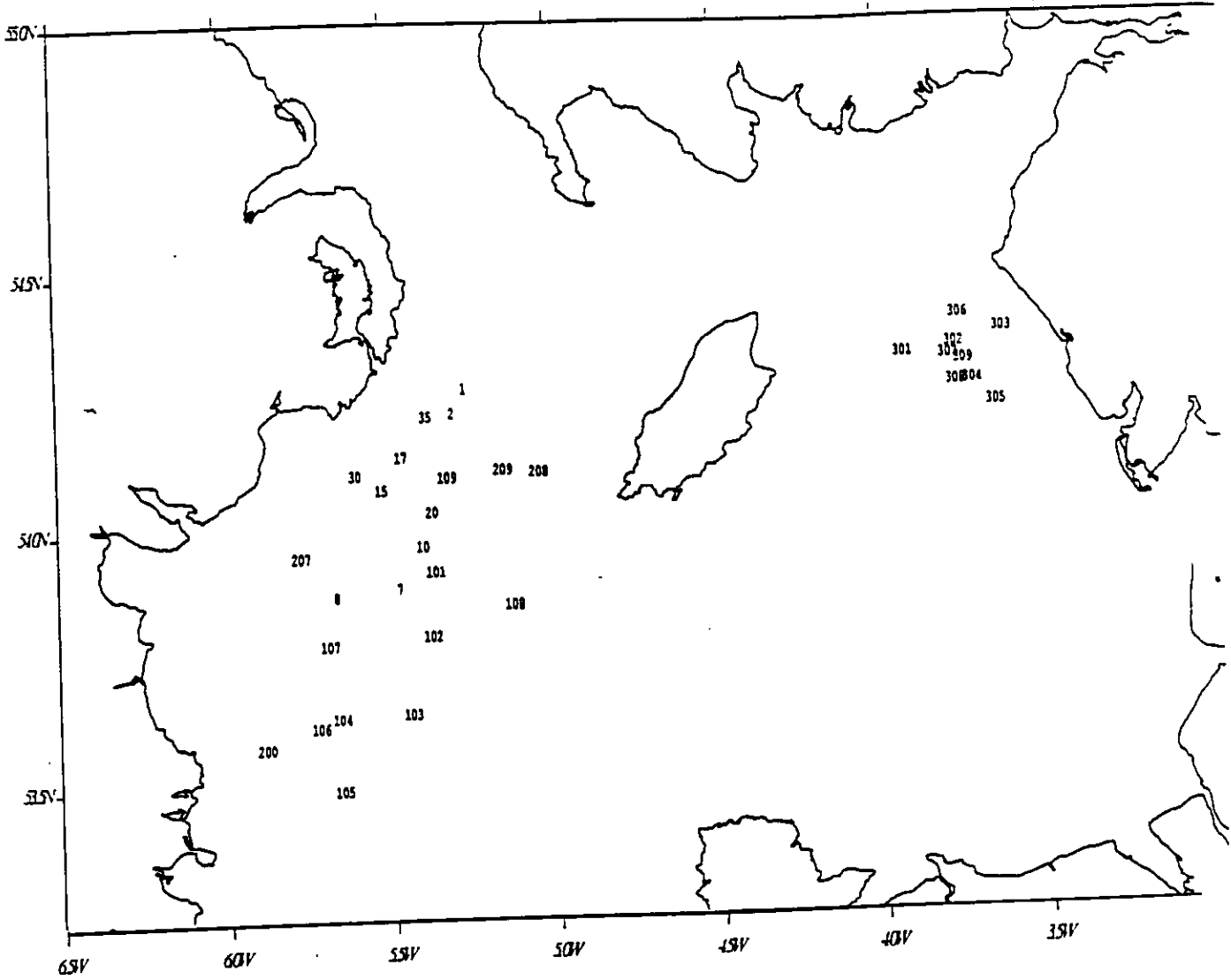


Table 3

Catch (kg) per nautical mile of tow (LF3399)

TOW	STN	NEPHROPS	COD	WHITING	HAKE	HADDOCK	HERRING	SPRAT	O. FISH
1	1	37.11	0.02	11.19	0.51	3.46	0.00	0.00	14.24
2	2	55.90	0.01	22.72	0.55	3.17	0.03	0.00	4.89
3	35	103.58	0.01	9.23	0.00	2.25	0.14	0.02	9.30
4	17	81.66	0.01	4.68	0.12	5.22	0.63	0.08	7.09
5	208	235.52	0.00	31.17	0.00	6.34	0.00	0.00	7.84
6	209	9.51	0.01	1.54	0.00	0.04	0.00	0.00	7.49
7	109	36.75	0.01	1.81	0.37	1.87	0.00	0.00	4.95
8	20	53.26	0.71	3.16	0.00	2.84	0.15	0.00	7.01
9	10	35.57	1.14	1.48	0.04	2.29	0.00	0.00	8.51
10	30	41.45	0.12	181.95	1.57	20.34	0.00	0.15	113.40
11	15	86.29	0.03	17.14	4.86	8.16	0.48	0.00	6.19
12	7	24.23	4.44	0.26	0.00	1.42	0.00	0.01	11.03
13	101	19.03	2.54	0.25	0.00	0.19	0.07	0.01	2.68
14	108	93.30	0.64	122.90	0.30	10.39	0.00	0.00	19.05
15	207	115.34	0.12	38.05	0.00	8.36	0.08	0.03	10.45
16	8	98.16	0.16	3.43	0.00	9.82	0.01	0.00	16.90
17	107	155.59	0.18	9.16	0.00	9.30	0.00	0.00	8.15
18	102	91.15	0.06	6.06	0.47	1.82	0.01	0.00	7.62
19	103	3.78	2.94	10.55	0.00	1.76	0.07	0.00	10.17
20	200	20.56	1.55	101.03	0.64	93.00	0.50	0.06	118.60
21	106	79.95	0.06	13.01	0.27	7.06	0.13	0.00	3.68
22	105	35.66	2.55	66.32	0.44	34.21	0.00	0.00	83.11
23	104	5.25	0.78	8.88	0.00	0.16	0.00	0.00	6.86
24	301	40.30	0.07	89.78	0.00	0.14	0.00	0.00	25.40
25	302	47.24	0.01	105.94	0.00	0.02	0.19	1.10	23.10
26	304	0.85	0.42	35.31	0.13	0.01	0.02	0.02	12.01
27	305	4.01	0.15	20.18	0.00	0.03	0.18	0.68	19.42
28	303	0.34	0.41	27.92	0.00	0.67	0.00	0.02	151.83
29	306	1.78	0.04	42.15	0.00	0.00	0.00	0.00	19.38
30	307	72.41	0.25	43.83	0.00	1.87	0.29	0.21	10.53
31	308	7.09	0.61	18.67	0.16	0.48	0.02	0.17	21.05
32	309	40.36	1.83	17.48	0.00	0.00	0.04	0.19	9.58

as indicated in Fig. 1. The species composition of the catch at each station was determined, and length-frequencies were recorded for each species. Length-stratified samples of whiting and haddock, and virtually all cod and hake, were taken for recording length, mass, sex and maturity stage, and for removal of otoliths for ageing. Cod and whiting in these samples were screened for infestation by external parasites. Stomach samples from squid were removed and frozen. Where possible 50 one year old herring were frozen for otolith analysis.

## CRUISE NARRATIVE

R.V. *Lough Foyle* departed Belfast Harbour at approx. 05:00 on Monday 27 October. Stations were fished as indicated in Table 1. Trawling took place in daylight only, the vessel either lying at anchor during darkness or drifting/dodging near the first station to be fished the following day. The trawl at station 100 had to be prematurely lifted due to the location of fixed fishing gear. The track at station 73 was also shorter than 3nm. This was due to a fishing vessel (the *Malita*, N160) coming close to the path of the *Lough Foyle* and failing to respond to radio requests for information of their heading. The mid-cruise break took place in Dublin from Friday 1 to Sunday 3 October. Gales reduced the ability to work on Sunday, and only one station was sampled. The survey was completed at station 61 on Thursday 7 October and the vessel then returned to Belfast during the late evening.

## WORK COMPLETED

Forty-four hauls were completed. (Fig. 1; Table 1). Over 23 tonnes of fish were sampled (968,000 individuals).

Length measurements were carried out on all fish species at each station. Catch weights were recorded for most invertebrates. A total of 33 cod, 790 whiting, 335 haddock and 121 hake were analyzed for length, mass and maturity and age. The small catches of larger fish caught in the western Irish Sea resulted in the reduced sample size compared to other recent surveys. The cod and whiting taken for biological analysis were screened for external parasites.

## PRELIMINARY RESULTS

Four species- sprat, whiting, haddock and lesser spotted dogfish made up approximately 80% of the total catch (Table 2). The majority of whiting caught were 0-group fish (10-20cm) with very poor

catches of adult whiting recorded off the Irish Coast in strata 2 and 3 (Figs 2 and 3, Table 3). There was no wide range in the size classes of haddock (Figure 3). This contrasts with surveys from recent years. However they were caught at 90% of stations. Grey gurnards were the fifth largest catch (0.8 tonnes).

Anchovies and John Dory are both "warmer-water" species and they were caught at 31 and 38% of the stations respectively (Table 2).

Preliminary indices of abundance for 1-group cod, whiting, haddock and herring were obtained from the length distributions (Table 4). More accurate indices will be available once the otoliths collected during the cruise have been aged. Results are summarized below:

- ◆ Catch-rates of 0-group cod (1999 year-class) were the highest in the series. This agrees with the high catch rates of cod during the *Nephrops* surveys this summer. The March survey in 2000 will be used to confirm these estimates.
- ◆ The 0-group whiting estimate is also the highest in the series, but similar to the estimates from the last two years.
- ◆ The index for 0-group haddock of the 1999 year class was the second highest in the series. Haddock of the 1999 year-class will be represented in fishery discards in 1999 and 2000, and in commercial landings from autumn 2000.
- ◆ Herring up to 18cm long (1-group fish) were less abundant than last year and below the series mean. Juvenile herring in the western Irish Sea have in earlier years comprised a mixture of fish from the Irish Sea and Celtic Sea stocks.

Data collected during cruise LF3999 will be incorporated in the stock assessments of Irish Sea cod, whiting and haddock at the ICES Northern Shelf Working Group in June 2000, and in the ICES assessment of herring in March 2000.

## PROBLEMS & RECOMMENDATIONS.

1. The data logging software requires updating. It often requires data to be entered twice and at least 6 entries must be made to enter the length of a catch of a single fish. It is unlikely to be 2000 compliant as it was written in the 1970's.
2. The thermosalinograph failed to operate correctly. The salinity reading was always 35.5 and it suggested that the temperature of the Irish Sea was 38°C! The thermosalinograph will be required throughout the EU funded egg surveys in 2000.
3. The telephone on the bridge caused problems. No call could be made to Great Britain whilst it was on the Eirecell system. It is important for the logistical success of any cruise that the scientists and officers can ring England, Scotland, Wales or the Isle of Man from all parts of the Irish Sea.
4. There is no functioning printer on the *Lough Foyle* at present. This slowed down the data analysis procedure and caused problems during the writing up stages of the cruise.
5. The long bench in the smaller wet laboratory is coming away from the wall. This may cause trouble in the future.

## ACKNOWLEDGMENTS

The Master and personnel of the *Lough Foyle* are thanked for their cooperation throughout the cruise and for ensuring efficient and consistent trawling operations. The scientific personnel are thanked for the very thorough work completed.

Signed:

Scientist - in charge: *Mark Colles*

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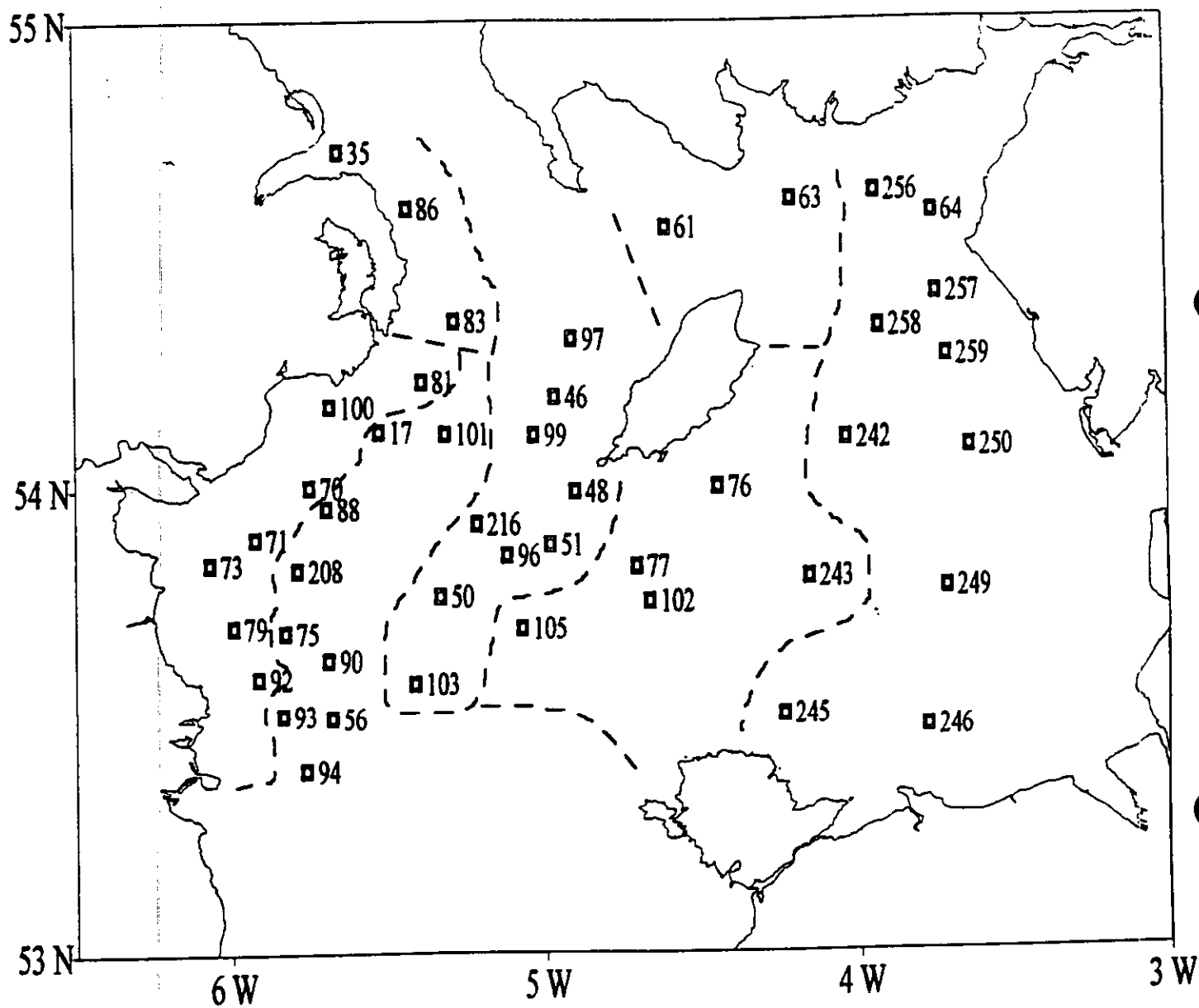
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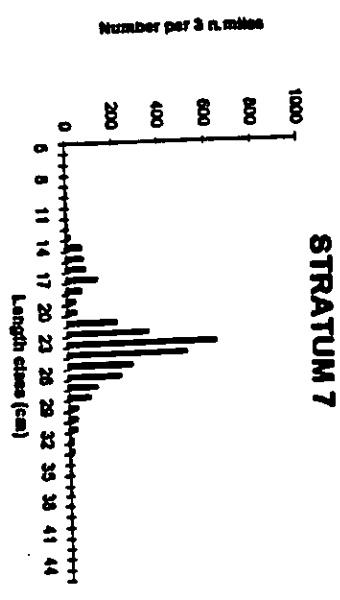
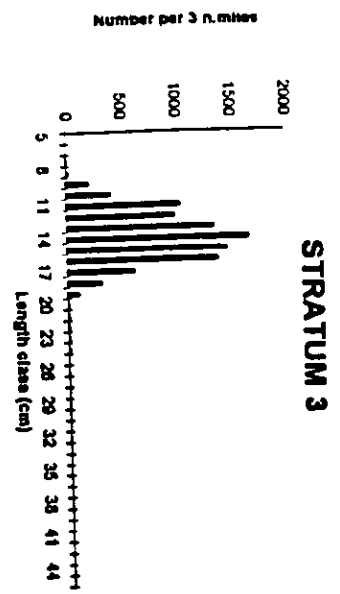
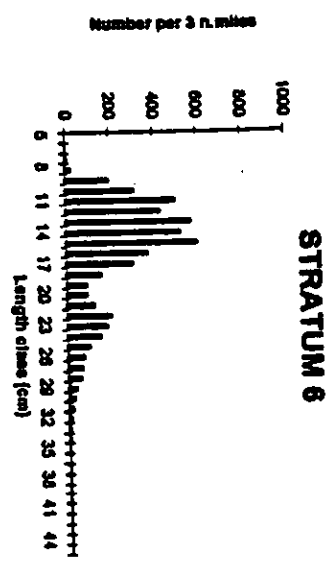
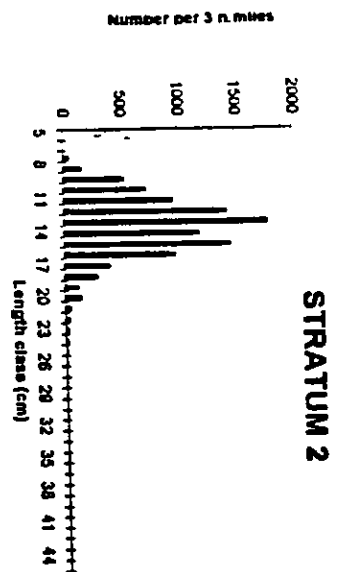
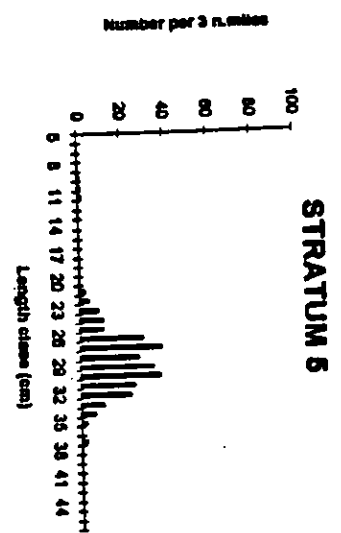
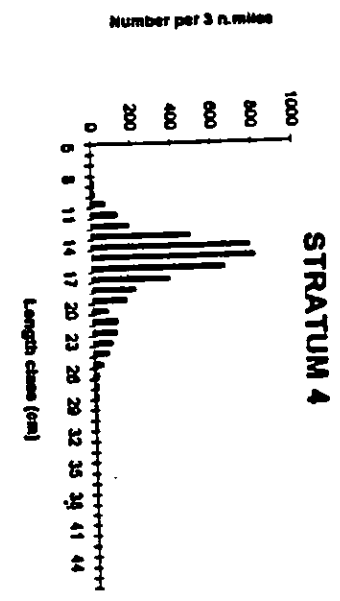
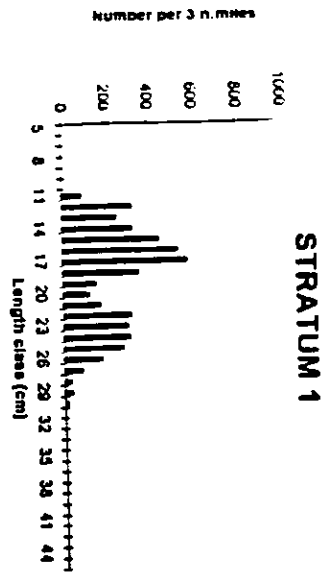
*On behalf of*  
Head, AESD Aquatic Systems:

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*Figure 1. Trawl Positions on LF3999  
27 September to 6 October 1999*



**Fig. 2** Length distributions of whiting in strata 1 - 7 during LF3999. Data are mean numbers caught per 3 nautical miles towed. (Note different scale in strata 2, 3 and 5)

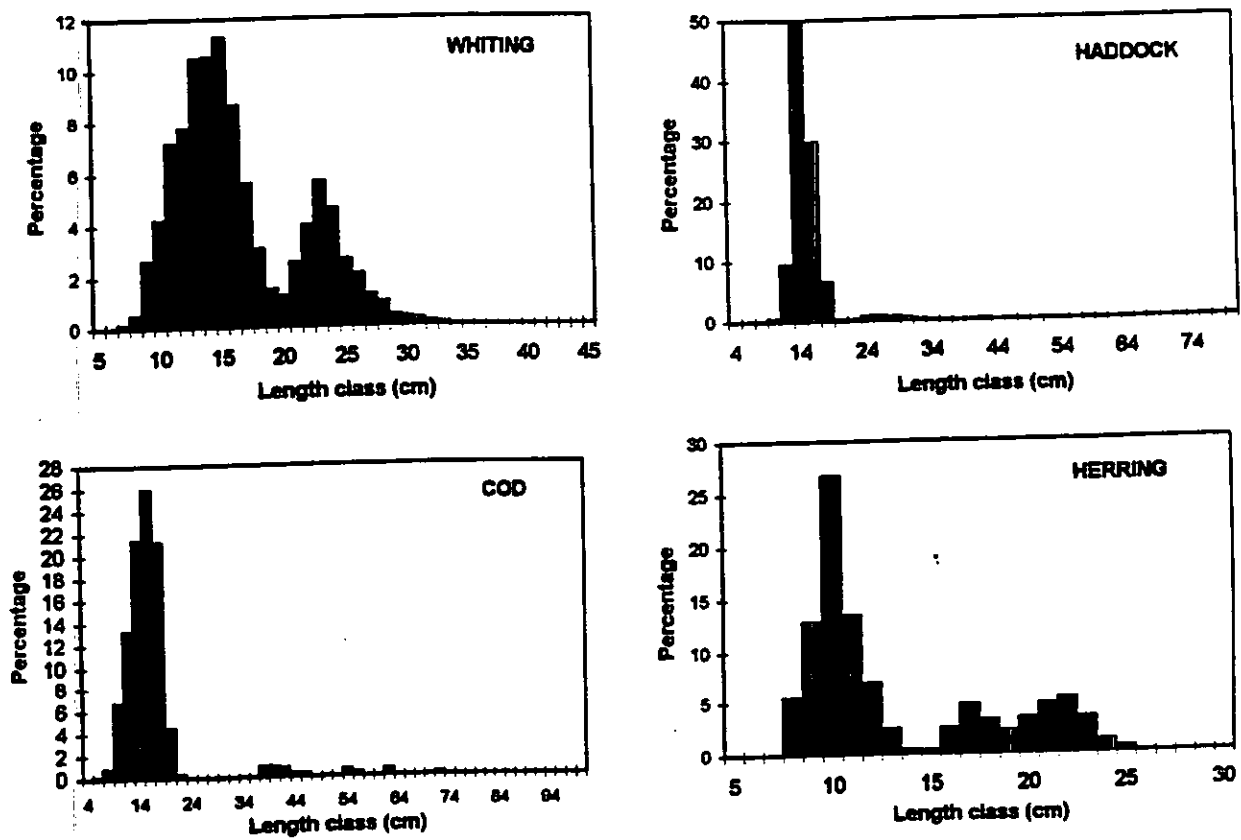


Fig. 3 Average percentage length compositions of whiting, cod, haddock and herring during cruise LF3999.

Table 1 Details of trawls during cruise LF3999

(Time in G.M.T.)

Date	Station	Time shot	Shooting position		Hauling position		Mean Depth (m)	Distance towed (nm)
			Latitude	Longitude	Latitude	Longitude		
27-Sep	35	6:16	54 43.2	5 41.8	54 43.3	5 36.3	18.0	3.00
	86	8:38	54 34.4	5 25.3	54 37.3	5 27.0	37.5	3.00
	83	11:34	54 22.8	5 17.9	54 19.9	5 16.8	81.5	3.00
	81	13:29	54 15.1	5 23.2	54 12.2	5 24.0	50.0	3.00
	17	15:15	54 8.4	5 30.1	54 6.1	5 33.3	52.0	3.00
28-Sep	97	6:15	54 20.5	4 55.4	54 17.6	4 53.8	73.5	3.00
	46	8:09	54 12.9	4 56.8	54 10.2	4 59.1	80.5	3.00
	99	9:44	54 7.9	5 1.1	54 5.4	5 3.1	75.5	3.00
	48	11:54	54 0.8	5 0.1	53 58.1	4 48.2	57.0	3.00
	51	13:40	53 54.1	4 59.8	53 51.2	4 58.2	72.0	3.01
	96	16:02	53 52.6	5 6.3	53 49.8	5 8.3	64.0	3.00
29-Sep	103	6:21	53 33.5	5 26.2	53 36.0	5 24.0	84.0	3.00
	50	8:29	53 44.6	5 21.1	53 47.5	5 19.2	76.0	3.00
	216	10:30	53 54.1	5 14.7	53 56.5	5 11.6	78.0	3.00
	101	12:55	54 5.4	5 18.7	54 8.4	5 19.6	101.5	3.00
	100	15:39	54 11.3	5 41.2	54 9.8	5 40.9	25.0	1.50
30-Sep	73	6:08	53 51.4	6 5.3	53 49.2	6 3.1	27.5	2.50
	71	7:51	53 53.2	5 57.9	53 53.9	5 52.9	36.7	3.00
	70	9:47	53 58.6	5 45.3	54 1.6	5 44.7	41.5	3.00
	88	11:56	53 58.9	5 41.5	53 55.9	5 42.2	55.0	3.00
	208	13:53	53 50.3	5 45.3	53 48.6	5 49.5	64.0	3.00
	75	15:45	53 42.8	5 48.9	53 40.0	5 50.7	57.5	3.00
01-Oct	79	6:15	53 43.2	6 1.8	53 41.2	5 57.5	31.5	3.15
	92	8:00	53 36.3	5 57.0	53 34.7	5 52.8	40.5	3.00
	93	10:00	53 32.0	5 50.8	53 29.3	5 49.8	53.0	3.00
03-Oct	94	10:01	53 22.3	5 44.4	53 24.7	5 47.2	73.0	3.00
04-Oct	56	6:28	53 30.3	5 38.3	53 30.2	5 43.3	75.0	3.03
	90	8:32	53 36.3	5 41.2	53 39.3	5 41.8	81.5	3.00
	105	11:51	53 41.0	5 6.5	53 42.7	5 2.2	68.5	3.00
	102	14:27	53 44.1	4 38.9	53 46.7	4 40.7	61.0	2.75
	77	16:10	53 48.7	4 44.1	53 51.0	4 40.5	69.0	3.00
05-Oct	76	6:10	53 59.4	4 29.0	54 0.7	4 24.4	45.0	3.00
	242	8:45	54 7.6	4 2.5	54 4.6	4 2.0	34.0	3.00
	243	11:27	53 49.5	4 11.3	53 47.4	4 7.7	45.0	3.00
	245	14:17	53 31.4	4 16.5	53 29.8	4 12.1	42.0	3.00
	246	16:35	53 28.5	3 49.2	53 29.2	3 44.1	33.0	3.12
06-Oct	249	6:14	53 45.9	3 41.0	53 47.8	3 44.9	38.0	3.00
	250	8:54	54 3.4	3 37.5	54 6.3	3 39.3	32.0	3.00
	259	10:52	54 15.1	3 41.9	54 18.1	3 43.7	36.0	3.00
	258	12:46	54 18.9	3 55.4	54 21.9	3 56.6	35.0	3.00
	257	14:48	54 23.2	3 43.9	54 26.1	3 45.6	25.0	3.00
	64	16:44	54 33.9	3 46.9	54 36.3	3 43.9	19.0	3.00
7-Oct	256	6:20	54 38.6	3 54.4	54 37.1	3 58.7	33.0	3.00
	63	8:25	54 37.5	4 10.2	54 36.3	4 15.0	55.0	3.00
	61	11:56	54 33.4	4 37.7	54 33.2	4 35.1	47.0	1.50