CRUISE REPORT: CRUISE LF1199 DEMERSAL FISH SURVEY

VESSEL: R.V. *Lough Foyle* (DANI) DATES: 15 - 25 March 1999

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

TYPE OF SURVEY: Otter trawl

OBJECTIVES

1. To obtain information on spatial patterns of abundance of different size- and age-classes of demersal fish in the northern Irish Sea.
2. To obtain abundance indices for the ICES assessments of whiting, haddock, cod and herring.
3. To monitor external parasite loads in whiting and cod, by area.
4. To collect data and samples of sprat and juvenile herring for population / feeding study.
5. To collect tissue samples from cod for a genetics study at Hull University.
6. To collect ovaries of whiting and haddock for estimation of fecundity (EU contract).
7. To record quantities of marine litter in trawl catches.

PERSONNEL

M.Armstrong	DANI	(SIC)
W. McCurdy	DANI	
C. Burns	DANI	
M. McAliskey	DANI	
J.Peel	DANI	
R. Snÿder	QUB	

METHODS

A commercial Rockhopper trawl fitted with a 20 mm liner in the cod-end was towed over three nautical miles where possible at the stations shown in Figure 1. Gear and towing procedures were those employed on all previous DANI groundfish surveys. A stratified survey design with fixed station positions was employed. The survey area was divided into seven strata defined by depth and substratum, 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. Ovaries of mature whiting and haddock were preserved in formaldehyde soultion at selected stations, for an EU-funded project. Sprats and juvenile herring were sampled from each catch for a PhD study on feeding and reproduction (Queen's University). Samples of pelvic fin tissue of cod from the two spawning populations off the Co. Down and Cumbrian coasts were preserved in ethanol for a genetics study at Hull University. Quantities of marine litter in each catch were recorded.

CRUISE NARRATIVE

R.V. *Lough Foyle* departed Belfast Harbour at approx. 06h.00 on Monday 15 March. 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 mid-cruise

reak took place in Dublin from Friday 19 to Sunday 21 March. Gales prevented work on Sunday, and he ship was anchored inshore for the day. The survey re-commenced at station 94 on Monday morning 22 March). The net was damaged at station 102 on Monday afternoon, preventing further work during he day. The survey was completed at station 61 on Thursday 25 March. The vessel then returned to Belfast, berthing during late evening.

WORK COMPLETED

Forty-four hauls were completed. (Fig. 1; Table 1). The first six hauls were made with a trawl net that had been rebuilt after being badly torn in the October 1998 survey. The door spread was found to be consistently about 20% greater at each depth than recorded in previous surveys. The net was removed for examination, and replaced with the spare trawl used on a number of previous surveys. The ScanMar readings for the replacement net were similar to those recorded in other surveys (door spread increasing from about 35m at 30m sounding to around 45m at 80m sounding, with variations due to tidal flow; average headline height 2.5 - 3.0 m).

Length measures were carried out on all fish species at each station. Catch weights were recorded for m[illegible]invertebrates. A total of 269 cod, 1039 whiting, 515 haddock and 89 hake were analyzed for length, mass and maturity and age. Approximately 25 small whiting were frozen for daily growth analysis at FRS, Aberdeen. A range of otoliths of whiting, haddock, bib and poor cod was collected for an image-analysis study at DANI. The cod and whiting taken for biological analysis were screened for external parasites. Samples of sprats and juvenile herring were collected at each station and frozen for analysis of diet and population structure (Ph.D study). Sprats with hydrated oocytes were preserved in formaldehyde solution for estimation of batch fecundity (Ph.D study). Samples of pelvic fin tissue were taken from 50 mature cod from the western Irish Sea and from 46 cod from the eastern Irish Sea for the genetics study at Hull University. Ovaries were taken from 104 mature whiting (60 from the western Irish Sea, 44 from the east) and 12 mature haddock for examination of oocyte morphology and fecundity (EU project). Some eggs of plaice, whiting and haddock were fertilized at sea and then frozen to provide standards for egg identification using iso-electric focusing (EU project). Gonad maturity stages were recorded for samples of poor-cod at selected stations. The quantity and type of marine litter in each catch was recorded. Trawl data and length frequencies were archived using the groundfish survey data base.

PRELIMINARY RESULTS

A total of 60 species of fish was recorded (Table 2). The three species herring, whiting and haddock made up 80% of the total catch. Juvenile herring were particularly abundant in catches made off the Irish coast. The majority of whiting caught were 1-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). Strong year-classes of haddock from 1994 onward have resulted in a wide size-range of this species in the catches (Fig. 3). Comparatively high densities of adult haddock were recorded in the western Irish Sea, particularly to the west and southwest of the Isle of Man (Table 3). Many haddock were in an advanced stage of gonad maturation, indicating widespread spawning in the western Irish Sea.

A notable event was the capture of a juvenile common skate at station 83. This species is considered to have been effectively absent from the Irish Sea in recent decades.

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 1-group cod (1998 year-class) were the lowest in the series. Low catch-rates of 0-group fish in the October 1998 survey also indicated a very weak 1998 year-class. There now appear to be two successive weak year classes (1997 and 1998) in the stock. They will have their greatest impact on the spawning stock as 3 – 4-year olds in 2001.

- Although catch-rates of 0-group whiting of the 1998 year-class were comparatively high in autumn 1998, the same year-class has given only average catch-rates as 1-group fish in cruise LF1199. Whiting of the 1998 year class will be represented in commercial fishery discards from 1998 - 2000 and in landings from autumn 2000 onwards.

- The index for 1-group haddock of the 1998 year class was the third highest in the series, a pattern also recorded in the series of 0-group indices from the autumn surveys. Haddock of the 1998 year-class will be represented in fishery discards in 1999 and in commercial landings from autumn 1999.

- Herring up to 18cm long (1-group fish) were very abundant in the catches, giving the highest index in the series. The index in March 1998 was also high. 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 LF1199 will be incorporated in the stock assessments of Irish Sea cod, whiting and haddock at the ICES Northern Shelf Working Group in June 1999, and in the ICES assessment of herring in March 2000.

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 fishing master and crew are thanked in particular for working late into the night of 22 March to repair the trawl net. The scientific personnel are thanked for the very thorough work completed.

Signed:

Scientist - in charge: Mike Armstrong date 25/3/99

Ships master: J.J. Hughes date 25/3/99

Head, AESD Aquatic Systems: D.J. Henry date 25/3/99

Table 1 Details of trawls during cruise LF1199 (Time in G.M.T.)

Date	Station	Time shot	Shooting position		Hauling position		Mean Depth (m)	Distance towed (nm)
			Latitude	Longitude	Latitude	Longitude		
15-Mar	35	7h.15	54 42.83	5 41.31	54 43.76	5 36.32	20.0	3.00
	86	9h.18	54 37.87	5 26.98	54 35.28	5 25.75	38.0	2.67
	83	12h.07	54 23.00	5 17.80	54 19.88	5 16.90	82.0	3.00
	17	15h.01	54 8.21	5 30.59	54 5.79	5 33.94	52.0	3.00
	100	16h.46	54 8.30	5 36.88	54 10.34	5 41.30	22.0	3.00
16-Mar	81	07h.06	54 15.11	5 23.23	54 12.22	5 24.20	49.0	3.00
	101	10h.05	54 7.67	5 19.23	54 4.68	5 18.59	87.0	3.00
	99	12h.20	54 5.33	5 3.83	54 7.91	5 1.02	80.0	3.00
	46	14h.08	54 10.80	4 58.09	54 13.56	4 55.83	80.0	3.00
"	97	16h.42	54 17.74	4 53.90	54 20.52	4 55.59	76.0	3.00
17-Mar	48	07h.04	54 0.95	4 59.45	53 58.00	4 57.96	55.0	3.00
	51	08h.55	53 53.51	5 0.75	53 51.08	4 57.71	72.0	3.00
	96	11h.32	53 52.47	5 5.89	53 49.52	5 5.26	72.0	3.00
	216	13h.56	53 56.16	5 11.99	53 53.76	5 15.10	78.0	3.00
	50	15h.58	53 46.26	5 20.40	53 43.42	5 22.24	80.0	3.00
18-Mar	208	07h.00	53 46.96	5 46.80	53 50.04	5 47.68	56.0	3.00
	88	09h.00	53 56.39	5 42.48	53 59.00	5 39.71	63.0	3.09
	70	10h.45	54 1.42	5 45.82	53 58.40	5 44.79	46.0	3.00
	71	12h.48	53 54.16	5 52.58	53 53.21	5 57.55	40.0	3.00
	73	14h.35	53 51.24	6 4.71	53 48.64	6 1.90	29.0	3.02
	79	16h.25	53 43.40	6 0.36	53 40.56	5 58.5	31.0	3.00
19-Mar	75	06h.57	53 42.2	5 51.39	53 39.28	5 50.5	54.0	3.00
	92	08h.40	53 36.8	5 55.76	53 35.34	5 51.7	48.0	3.00
	90	10h.40	53 38.5	5 42.28	53 35.6	5 40.8	84.0	3.00
	93	12h.43	53 32.2	5 50.2	53 29.3	5 49.2	60.0	3.02
22-Mar	94	06h.56	53 21.9	5 45.3	53 24.6	5 47.3	73.0	3.00
	56	08h.52	53 40.5	5 42.7	53 30.1	5 37.4	75.0	3.00
	103	10h.49	53 33.1	5 26.3	53 35.8	5 24.0	87.0	3.00
	105	13h.15	53 41.0	5 5.7	53 43.1	5 1.9	76.0	3.00
net torn	102	15h.32	53 44.3	4 42.3	53 46.1	4 38.5	63.0	3.00
23-Mar	245	08h.07	53 31.4	4 17.0	53 30.2	4 12.3	41.0	3.00
	246	10h.56	53 29.1	3 43.6	53 28.5	3 47.6	33.0	2.50
	249	13h.53	53 46.0	3 41.6	53 48.3	3 45.4	36.0	3.00
	243	16h.20	53 47.4	4 7.6	53 49.5	4 11.4	48.0	3.00
24-Mar	77	7h.06	53 48.4	4 44.5	53 50.7	4 41.2	82.0	3.00
	76	09h.30	53 59.1	4 29.0	54 0.7	4 24.5	43.0	3.00
	242	12h.20	54 4.6	4 2.4	54 7.8	4 2.1	30.0	3.00
	250	14h.59	54 3.4	3 37.9	54 6.4	3 39.7	33.0	3.00
	259	17h.00	54 15.2	3 42.4	54 18.1	3 43.4	38.0	3.00
25-Mar	258	06h.53	54 18.7	3 55.7	54 21.6	3 57.1	36.0	3.00
	257	08h.56	54 23.1	3 44.3	54 25.8	3 46.1	28.0	3.00
	64	10h.55	54 34.2	3 46.2	54 36.9	3 43.6	18.0	3.00
	256	12h.47	54 38.2	3 55.1	54 36.8	3 59.8	32.0	3.00
	63	14h.42	54 37.4	4 10.2	54 36.4	4 15.1	56.0	3.00
	61	17h.05	54 33.1	4 32.8	54 33.1	4 34.4	50.0	0.90

Table 2 Species compositions of catches (in kg) by station and survey stratum in cruise LF1199 (0.0 = < 0.05 kg)

		Stratum 1			Stratum 2						
code		35	86	83	81	100	70	71	73	79	92
COD	Cod		3.6	12.3	3.5	3.0	20.7	65.3	2.5	17.3	0.7
WHG	Whiting	214.5	21.6	62.8	33.4	18.0	307.5	211.3	60.1	134.6	248.0
HAD	Haddock	6.1	3.7	4.3	7.9	11.0	7.6	134.2		1.0	42.5
HKE	Hake			0.3	0.9				0.3		1.7
NOP	Norway pout			0.0	0.1		0.4				
POD	Poor cod	0.1	1.3	1.3	1.5	0.0	0.3				
BIB	Bib	0.2	0.3	0.3			0.2				
POL	Pollack										
POK	Coalfish										
LIN	Ling										
WHB	Blue whiting										
HER	Herring	26.0	2.9	1.4	84.7	0.5	204.4	60.3	702.1	2844.1	629.5
SPR	Sprat	12.5	0.3	0.3	9.1	7.9	30.0	50.3	41.1	21.3	12.8
ANE	Anchovy										
PLS	Pearlside										
MAC	Mackerel		0.7	0.4			0.2				0.2
HOM	Horse mackerel										
PLE	Plaice	1.9	0.2	0.1	2.1		13.7	68.0	201.4	218.6	29.9
DAB	Dab	0.3	0.1	0.0	8.5	16.2	40.0	38.9	37.0	34.0	8.1
FLE	Flounder				0.0	10.4	1.6	0.9	9.6	4.2	
LEM	Lemon sole		0.7	0.2	0.2			1.1			0.8
SOL	Dover sole						0.1				
TBS	Thickback sole					0.0					
SOT	Solenette			0.1	0.6	0.0	0.5	0.3	0.4	0.9	0.1
PLA	Long rough dab										0.2
MEG	Megrim			0.0							
WIT	Witch										
SDF	Scaldfish										
TKT/NKT	Topknots										
TUR	Turbot					0.9					
BLL	Brill	0.1									
					0.5						
MON	Anglerfish			0.0	0.1		0.2				
ARG	Argentine										
ESB	Bass										
BKS	Black seabream										
COE	Conger eel										
CDT	Dragonette (common)	0.0	0.1	0.3	0.2	0.2	1.3	0.2	0.2	0.3	0.3
SDT	Dragonette (spotted)			0.0	0.1		0.0	0.0	0.0		
FSG	Goby (Fries)				0.0						
GPA	Goby (other)			0.0							
GUG	Gurnard (grey)	0.1	0.0	2.7	0.4	0.1	0.0			0.2	0.2
GUR	Gurnard (red)										
TUB	Gurnard (tub)										
JOD	John Dory					0.0	0.1				
POG	Pogge		0.0								
RPF	Red band fish (Cepola)				0.6		0.6				
TBR	Rockling (3-bearded)										
FRR	Rockling (4-bearded)			0.0							
FVR	Rockling (5-bearded)										
GSE	Sandeel (greater)										
MSE	Sandeel (lesser)	0.0									
LPS	Sea snail		0.0					0.0	0.0		
SBY	Snake blenny										
WEL	Weever (lesser)										
GDY	Goldsinny wrasse				5.6						
LSD	Lesser spotted dogfish		2.5								
DGN	Greater spotted dogfish										
SMH	Smooth-hound (common)										
DGS	Spurdog										
GAG	Tope										
THR	Thornback ray										
SDR	Homelyn ray										
UNR	Undulate ray										
CUR	Cuckoo ray			0.1							0.9
SKT	Common skate			8.4		0.1					
NEP	Nephrops		0.0	0.4							
PSV	Pasiphaea	0.0	0.0	0.1		0.1					
PDB	Pandalids	0.0	0.0	0.0							
CSX	Crangonids	0.1		0.0							
LMD	Swimming crabs										
MUX	Spider crabs	0.0	0.0	0.3		1.9	0.1	1.1	0.4	0.0	0.2	0.6
ATS	Alloteuthis										
LLV	Loligo			0.0				0.3			
SPY	Sepiola										
EDC	Eledone										
QSC	Queen scallop		2	5		19	16	32	60	41	11	3
	Large jellyfish[1]										
AAC	Aphrodite										

1. Numbers rather than weight

Table 2 contd.

	Stratum 3								
	101	17	88	208	75	90	56	93	94
Cod	0.9	17.3	5.9	27.7	29.8	6.3	13.9	33.0	9.0
Whiting	24.9	128.6	140.1	106.5	228.6	2.8	6.9	92.3	16.8
Haddock	15.4	47.9	48.5	21.2	183.7	2.0	5.0	20.5	39.6
Hake	11.3	0.6	1.6	4.4	3.9	0.0		1.2	
Norway pout	0.5		7.7	0.3	0.3		0.0	0.8	0.6
Poor cod	4.9	0.7	0.6	0.4	0.2	0.1	0.7	2.0	0.5
Bib									3.6
Pollack			0.9						
Coalfish									
Ling									
Blue whiting	0.0								
Herring	1.1	68.0	256.7	705.3	244.7	7.2	2.9	3.3	36.8
Sprat	3.2	10.0	2.4	15.8	14.9	22.8	6.9	0.9	10.0
Anchovy	0.0						0.0		
Pearlside							0.0		
Mackerel		0.1							
Horse mackerel	0.8	0.6	0.5	1.7	0.6	0.3	0.2	0.7	0.3
Plaice		2.1	0.9	11.2	8.0	0.2	4.6	5.1	6.4
Dab		42.3	10.5	6.7	3.5	0.1	0.3	2.3	0.4
Flounder									
Lemon sole	0.8	0.1	1.0		0.5	0.3	0.1	1.0	0.7
Dover sole								0.1	0.1
Thickback sole							0.0	1.1	
Sole									
Long [illegible]ab	0.0	0.3	0.4	0.3	0.2		0.0	0.4	0.4
Megrim	0.1								
Witch				0.4					
Scaldfish									
Topknots									
Turbot									
Brill			1.6					3.6	
									2.0
Anglerfish	1.1								
Argentine			0.1	0.1					
Bass									
Black seabream									
Conger eel									
Dragonette (common)	0.0	0.3	0.4	0.1	0.2	0.1		0.2	
Dragonette (spotted)									
Goby (Fries)		0.0	0.0	0.0					
Goby (other)	0.0		0.0				0.0		
Gurnard (grey)	3.3	0.1	1.4	0.8		0.4	20.6	0.7	0.1
Gurnard (red)			0.1					0.2	
Gurnard (tub)								0.5	0.2
John Dory	0.4							0.1	
Pogge									
Red band fish (Cepola)		0.1							
Rockling (3-bearded)									
Rockling (4-bearded)					0.0				
Ro[illegible]-bearded)							0.0		
Sa[illegible]eater)									
Sandeel (lesser)	0.0								
Sea snail									
Snake blenny	0.0	0.1	0.9	1.1	0.0				
Weever (lesser)									
Goldsinny wrasse									
Lesser spotted dogfish							12.4	9.5	5.8
Greater spotted dogfish									
Smooth-hound (common)									
Spurdog	0.1								
Tope									
Thornback ray									
Homelyn ray	0.3						1.6		
Undulate ray								0.0	
Cuckoo ray									
Common skate									
Nephrops	27.5		0.8	5.6	8.7	0.7	4.0	6.2	
Pasiphaea	7.5					7.1	2.8	8.1	12.2
Pandalids	0.5					0.4	0.3	0.0	0.1
Crangonids	0.0					0.2	0.2	0.0	0.0
Swimming crabs	0.0						1.0	0.0	
Spider crabs									0.0
Alloteuthis	1.3	0.6	1.6	1.9	0.6	0.0	0.3	0.6	0.3
Loligo									
Sepiola	0.0						0.0	0.0	0.0
Eledone	0.2		0.7		0.6			0.0	
Queen scallop									
Large jellyfish[1]	10	26	13	13	35	9	22	2	6
Aphrodite									

	Stratum 4								
	97	46	99	48	216	51	96	50	103
Cod	20.9	9.4	6.9	20.3	6.8	20.9	8.1	3.2	5.4
Whiting	60.8	333.7	199.2	192.3	18.5	76.7	254.0	8.0	6.2
Haddock	105.4	216.9	85.5	213.0	9.8	124.8	44.5	7.8	1.5
Hake	0.8	5.4	2.8	0.9	0.7	1.2	2.2	0.1	
Norway pout	0.1	2.0	7.7	26.9	0.3	18.8	1.0	0.1	0.0
Poor cod	3.8	6.7	8.4	33.9	1.8	2.2	2.2	0.5	2.8
Bib	2.2	2.9	0.8	0.9	0.2		0.0		
Pollack				4.3					
Coalfish	0.9			1.3					
Ling									
Blue whiting			0.0	0.1					
Herring	0.9	0.4	3.1	229.6	2.9	2.9	12.3	2.3	9.3
Sprat	0.6	0.3	0.1	0.1	1.3	1.4	0.6	2.5	5.7
Anchovy					0.0		0.0	0.0	0.0
Pearlside	0.0	0.0	0.0						
Mackerel				4.0					
Horse mackerel	0.0	0.1	0.0	0.3	0.0	0.4		0.0	0.1
Plaice	0.4	0.9	2.1	0.2	0.6	2.4	1.1	0.3	2.8
Dab	0.2	0.0	0.7	0.4	0.3	2.6	3.1		0.1
Flounder				1.2		2.0			
Lemon sole	0.8	2.8	3.2	1.3	1.7	9.8	3.2	0.2	0.1
Dover sole	0.4								0.5
Thickback sole	0.1		0.1	0.5	0.1	1.9	0.5	0.0	0.1
Sole									
Long [illegible]ab	0.1	0.2	0.3	0.0	0.0	0.0	0.1		
Megrim			0.1						0.3
Witch	0.1	0.5							
Scaldfish									
Topknots	0.0								
Turbot									
Brill									
Anglerfish	1.8	2.7		1.6	0.7				
Argentine	0.1	0.1	0.0	0.2	0.0		0.0		
Bass									
Black seabream									
Conger eel									
Dragonette (common)	0.7	0.2	0.1	0.4					
Dragonette (spotted)	0.0		0.0			0.0	0.0		
Goby (Fries)									
Goby (other)			0.0					0.0	
Gurnard (grey)	3.2	4.6	10.7	0.4	3.3	0.8	1.5	0.1	2.5
Gurnard (red)	4.7	8.9	0.9	6.0	0.4	20.8	0.9	0.3	0.2
Gurnard (tub)		1.2			0.2				2.2
John Dory			0.3			0.3			
Pogge									
Red band fish (Cepola)									
Rockling (3-bearded)									
Rockling (4-bearded)			0.0		0.0		0.0		
Ro[illegible]-bearded)									
Sa[illegible]eater)									
Sandeel (lesser)									
Sea snail		0.0	0.0		0.0				
Snake blenny									
Weever (lesser)									
Goldsinny wrasse	0.4			64.1		96.6	0.3		1.1
Lesser spotted dogfish									
Greater spotted dogfish									
Smooth-hound (common)									
Spurdog									
Tope									4.6
Thornback ray									22.4
Homelyn ray									
Undulate ray									0.1
Cuckoo ray									
Common skate									
Nephrops	28.5	35.2	10.0	0.3	28.3	0.5	26.9	7.4	0.2
Pasiphaea					1.5	1.2		8.8	1.6
Pandalids						0.0		0.1	0.1
Crangonids					0.0			0.1	0.3
Swimming crabs				0.0		0.1		0.0	0.3
Spider crabs									
Alloteuthis	1.4	5.1	4.4	0.2	1.8	1.4	1.4	0.1	0.0
Loligo						0.3			
Sepiola							0.0	0.0	0.0
Eledone	0.0		0.0				0.0		
Queen scallop	0.4	0.1	1.3						
Large jellyfish[1]									
Aphrodite	1	5	3	5	4	7	5	4	24
						0.0			0.0

1. Numbers rather than weight

Table 2 contd.

	Stratum 5		Stratum 6								Stratum 7					
	63	61	246	242	249	250	258	259	257	256	64	76	77	102	243	245	105
Cod	26.2		5.9	10.1	22.4	4.8	10.8	18.8		6.2		5.4	17.0		6.9	13.9	3.2
Whiting	10.9	1.1	199.7	485.8	30.6	159.8	791.3	272.1	50.4	14.6	16.4	50.7	35.6		39.2	51.8	8.1
Haddock	15.7	0.1		6.2	2.6		0.3			2.1		0.3	5.7		0.1		44.2
Hake	1.1							1.5	2.3			2.1	0.5		0.5		
Norway pout			0.0		0.1		0.2	0.0	0.0			0.0	0.0		0.0	0.1	0.1
Poor cod	1.5	0.0	4.5		1.4	1.4	0.5	0.7	0.1	0.2		1.3	1.9		2.4	1.6	0.3
Bib	2.0		0.2			1.1	6.3	1.7	1.9			0.4			3.2	0.2	
Pollack									2.9						1.6		
Coalfish		6.3															
Ling																	
Blue whiting																	
Herring	7.5	0.9	3.1	2.5	2.0	35.6	11.6	21.6	64.2	7.4	5.9	4.2	0.7		0.5	35.5	1.2
Sprat		0.0	0.4	19.0	1.4	4.2	1.2	1.4	12.4	10.4	69.4	0.2	0.7		0.1	1.0	1.5
Anchovy																	
Pearlside															0.0		
Mackerel				0.6													
Horse mackerel												0.4	0.0				0.6
Plaice	1.8	0.5	4.8	43.1	2.6	4.1	54.4	5.5	8.1	5.1	10.1	0.8	2.0		4.2	11.1	7.3
Dab	0.1		130.4	3.7	4.9	47.5	17.5	5.9	3.9	0.8	2.0		0.2		0.5	0.1	0.3
Flounder			10.5	8.7	1.6	0.4	10.2	1.9	1.8	1.0	4.9	0.6	3.5		43.8	119.5	
Lemon sole	0.8	0.3		0.3				0.1			0.1	0.7			0.5	0.8	0.5
Dover sole			1.1		0.4		0.6	0.3	0.7		0.7		0.1			0.9	0.1
Thickback sole												0.1	0.7		0.2		0.8
Solenette						0.1	0.0	0.1	0.1		0.0						
Long rough dab							0.2	0.1	0.0								
Megrim																	
Witch			0.0					0.1									
Scaldfish					0.0	0.0			0.0								
Topknots																	
Turbot										0.5	5.5						
Brill																	
Anglerfish				1.0													
Argentine																0.3	
Bass															0.1		
Black seabream																	
Conger eel																	
Dragonette (common)	0.4	0.1	0.2	0.2	0.1	1.1	0.9	0.1		0.1	0.1	0.4	0.1		0.5	0.2	
Dragonetta (spotted)			0.0		0.0												
Goby (Fries)																	
Goby (other)									0.0							0.0	0.0
Gurnard (grey)	0.1		0.4		0.0	0.2	0.2	0.0		0.0	0.1	0.1	0.8		2.5		6.0
Gurnard (red)			0.2									5.9	2.8		15.8	3.2	41.4
Gurnard (tub)			0.2				0.1	0.1				0.5			0.5		
John Dory												0.3					
Pogge			0.0		0.0			0.0								0.0	0.0
Red band fish (Cepola)																	
Rockling (3-bearded)		0.0					0.1	0.0									
Rockling (4-bearded)								0.1									
Rockling (5-bearded)				0.2	0.1										0.0		
Sandeel (greater)													0.0		0.0		0.0
Sandeel (lesser)																	
Sea snail		0.0													0.0		
Snake blenny					0.2		0.0	0.0	0.0		0.1						
Weever (lesser)												10.5	1.6		26.2	9.2	0.3
Goldsinny wrasse	0.0														6.2	0.9	
Lesser spotted dogfish	9.7		7.0	11.0	4.9		3.8		1.5	5.8	7.3						
Greater spotted dogfish																	
Smooth-hound (common)																	
Spurdog																	
Tope																	1.3
Thornback ray			6.5				3.8						0.6				1.0
Homelyn ray			0.0	2.0			0.5								0.0		
Undulate ray												0.3					
Cuckoo ray				0.5							0.5						
Common skate																	
Nephrops						8.3	26.2	13.4	17.3		0.7		0.0		0.0	0.4	0.4
Pasiphaea	0.0												0.0		0.0	0.0	0.0
Pandalids	0.0	0.0	0.0		0.0			0.0		0.0			0.0				0.0
Crangonids	0.0	0.0	0.0		0.0							0.0	0.0		0.2		1.0
Swimming crabs		0.0	0.1		0.6	0.0			0.0	0.1	0.1	0.0					
Spider crabs												0.4	0.1		0.2	0.1	0.1
Alloteuthis	0.0	0.0	0.0	0.4	0.0	0.5	0.3	0.6	0.4	0.2	0.1						
Loligo															0.0	0.0	
Sepiola	0.0		0.0		0.0			0.0							0.1		
Eledone												0.0	0.8		0.7		
Queen scallop			0.0		0.2							5	7		1		1
Large jellyfish[1]										0.1	0.2						
Aphrodite	0.0																

1. Numbers rather than weight

Table 3 Catches in kg per 3 nautical miles (approx 1 hour) towed, for fish below and at or above the minimum landing size of 27 cm (whiting) and 30 cm (haddock) during cruise LF1199.

STRATUM	STATION	WHITING		HADDOCK	
		below MLS	above MLS	below MLS	above MLS
1	35	213.8	0.7	6.1	0.0
	86	16.7	7.6	3.1	0.6
	83	57.1	5.8	0.6	3.8
2	81	31.3	2.1	0.9	7.1
	100	17.5	0.5	6.0	4.9
	70	304.3	3.3	5.8	1.8
	71	207.7	3.6	26.2	108.0
	73	58.3	1.4	0.0	0.0
	79	134.6	0.0	1.0	0.0
	92	239.2	8.7	27.6	15.0
3	101	20.7	4.2	1.3	14.0
	17	125.1	3.5	9.2	38.6
	88	130.5	5.5	11.9	36.3
	208	103.8	2.7	4.5	16.7
	75	222.7	6.0	160.8	22.9
	90	2.2	0.6	0.2	1.8
	56	5.9	0.9	0.1	4.9
	93	75.8	15.9	10.6	9.7
	94	13.9	2.9	1.5	38.1
4	97	48.1	12.7	3.0	102.4
	46	206.3	127.4	3.7	213.2
	99	167.7	31.5	2.4	83.2
	48	160.8	31.5	49.9	163.0
	216	16.2	2.3	0.0	9.7
	51	69.6	7.1	45.2	79.7
	96	220.9	33.1	3.4	41.1
	50	6.9	1.1	0.0	7.8
	103	5.6	0.6	0.4	1.1
5	63	8.5	2.4	12.0	3.7
	61	1.0	2.7	0.1	0.0
7	77	32.1	3.5	1.9	3.8
	102				
	76	12.3	38.3	0.3	0.0
	243	30.0	9.2	0.1	0.0
	245	27.0	24.8	0.0	0.0
	105	6.6	1.5	0.3	44.0
6	246	149.1	90.5	0.0	0.0
	242	265.6	220.2	0.0	6.2
	249	22.1	8.5	0.0	2.6
	250	105.1	54.6	0.0	0.0
	259	222.2	49.9	0.0	0.0
	258	603.0	188.3	0.3	0.0
	257	41.5	8.9	0.0	0.0
	256	13.4	1.2	0.2	1.9
	64	15.5	0.8	0.0	0.0
Mean: Strata 2 - 4		103.8	12.4	15.0	40.8

Table 4 Preliminary indices of abundance of 1-group cod, whiting, haddock and herring from cruise LF1199, based on length frequency data only. Data are mean numbers caught per 3 nautical miles towed. Indices from previous autumn surveys covering the eastern and western Irish Sea are also given. Indices for autumn surveys are given in Table (b).

(a) March surveys

	COD		WHITING		HADDOCK		HERRING	
SURVEY		1-gp		1-gp		1-gp		1-gp
1992		23.4		1477		15.3		190
1993		1.7		667		1.4		681
1994		13.8		1790		6.4		923
1995		7.1		1696		248.2		480
1996		11.3		1478		10.7		487
1997		5.4		1419		251.0		612
1998		1.7		1730		39.1		1472
LF1199 1999		0.5		1376		60.5		2010

(b) Autumn surveys

	COD		WHITING		HADDOCK		HERRING	
SURVEY	0-gp	1-gp	0-gp	1-gp	0-gp	1-gp	0-gp	1-gp
1991					175[1]			
1992	0.6	10.8	1454	995	1	8	177	21
1993	7.9	5.5	1554	425	45	1	412	44
1994	13.3	9.5	2450	686	567	11	194	176
1995	7.8	12.1	3199	483	17	102	37	55
1996	14.8	4.8	2628	605	1433	12	117	11
1997	4.2	13.5	3219	655	164	397	138	302
1998	0.4	3.6	3641	n/a	417	39	347	53

1998 data provisional

1. Assuming zero abundance in eastern Irish Sea

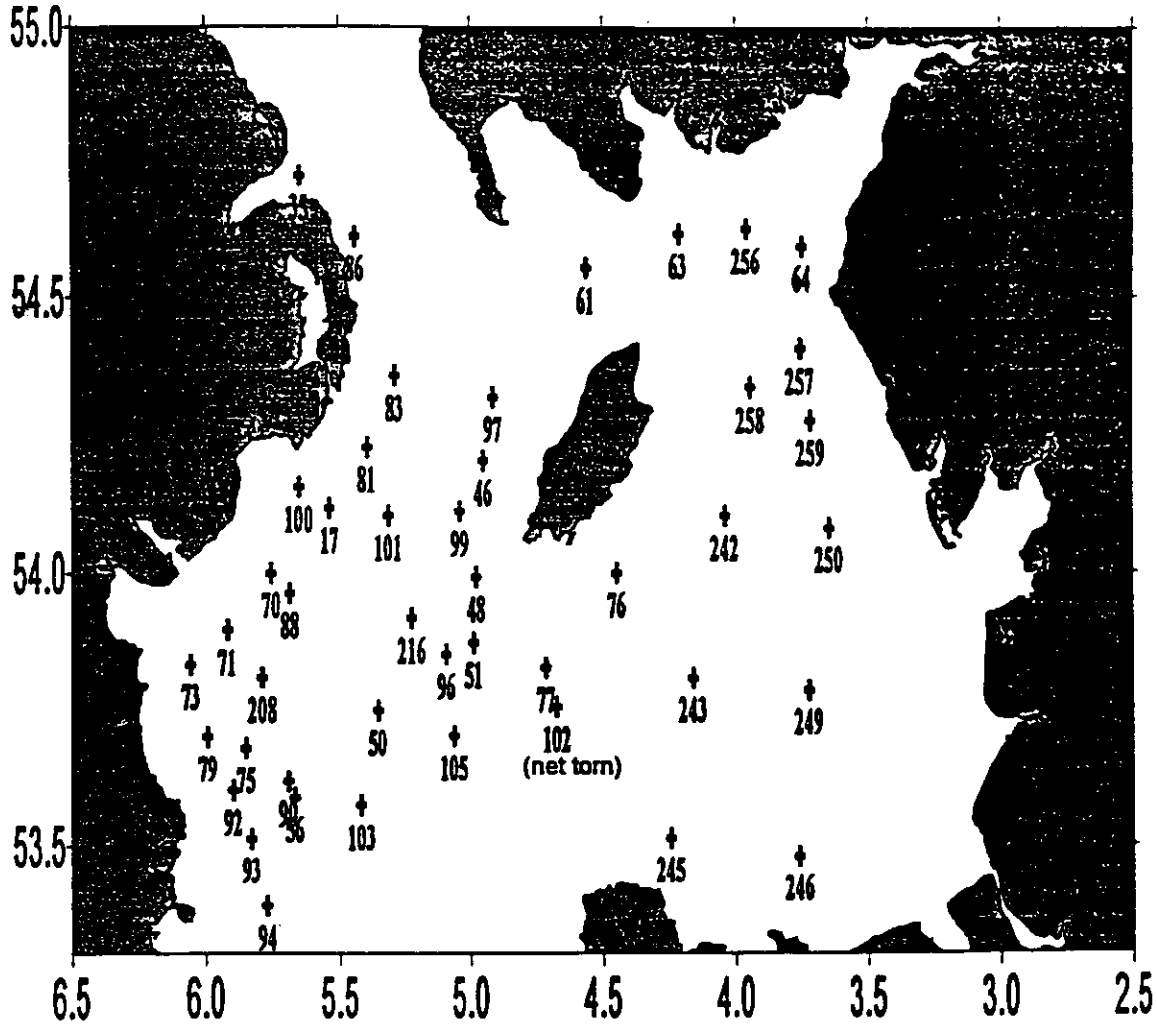

Fig. 1. Trawl positions for cruise LF1199.

Definition of survey strata:

Stratum 1: Belfast Lough to Strangford Lough: <100m; mixed sediments
Stratum 2: Irish Coast < 50m. Sand and finer sediments.
Stratum 3: Irish Coast 50 - 100m. Muddy sediments
Stratum 4: W and SW Isle of Man, 50 - 100m. Mud and muddy sand.
Stratum 5: North Isle of Man. <50m. Gravel.
Stratum 6: Eastern Irish Sea. < 50m. Sand and finer sediments.
Stratum 7: South IOM. <100m. Mixed gravel and sand.

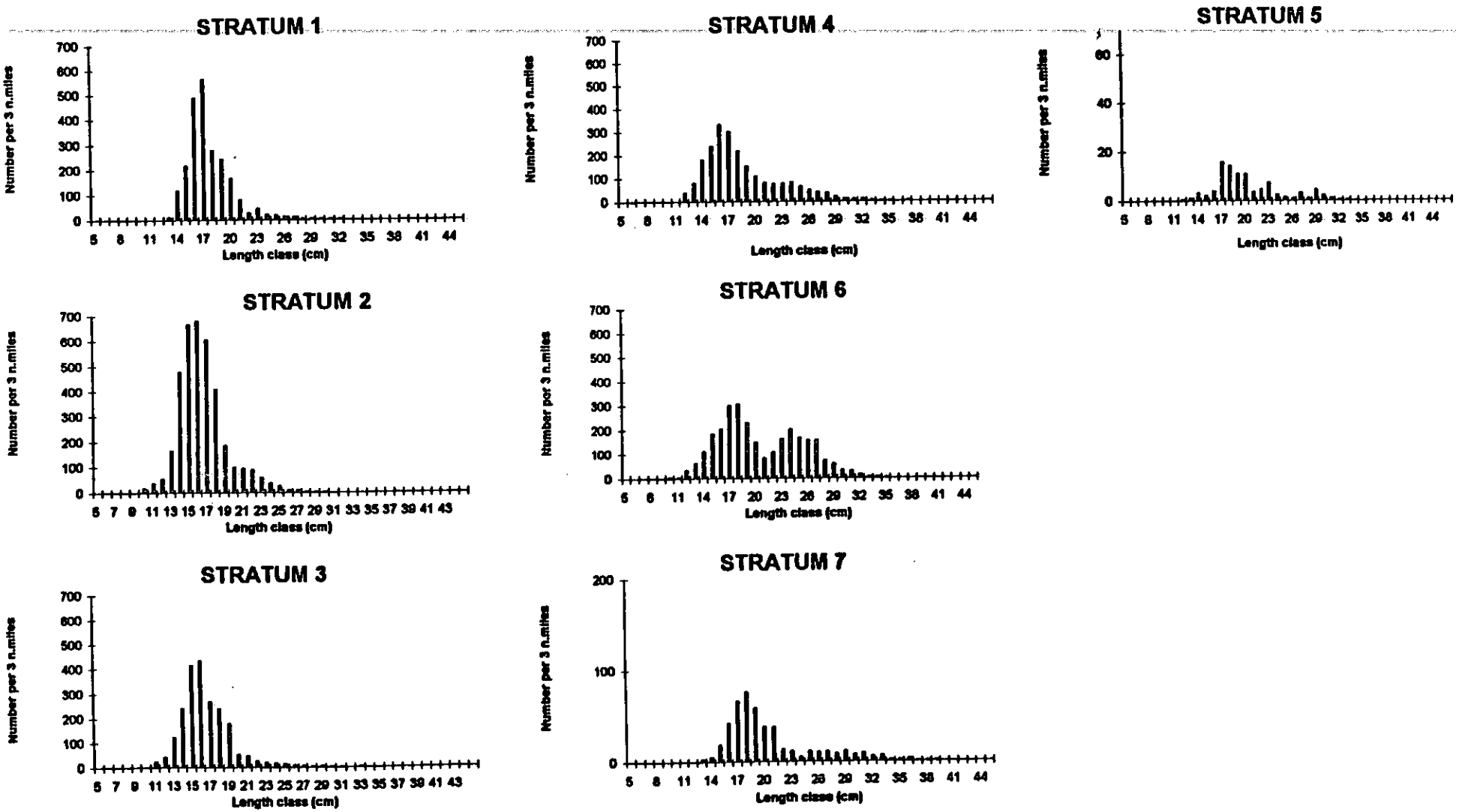

Fig. 2 Length distributions of whiting in strata 1 - 7 during LF1199.
Data are mean numbers caught per 3 nautical miles towed. (Note different scale in strata 5 and 7)

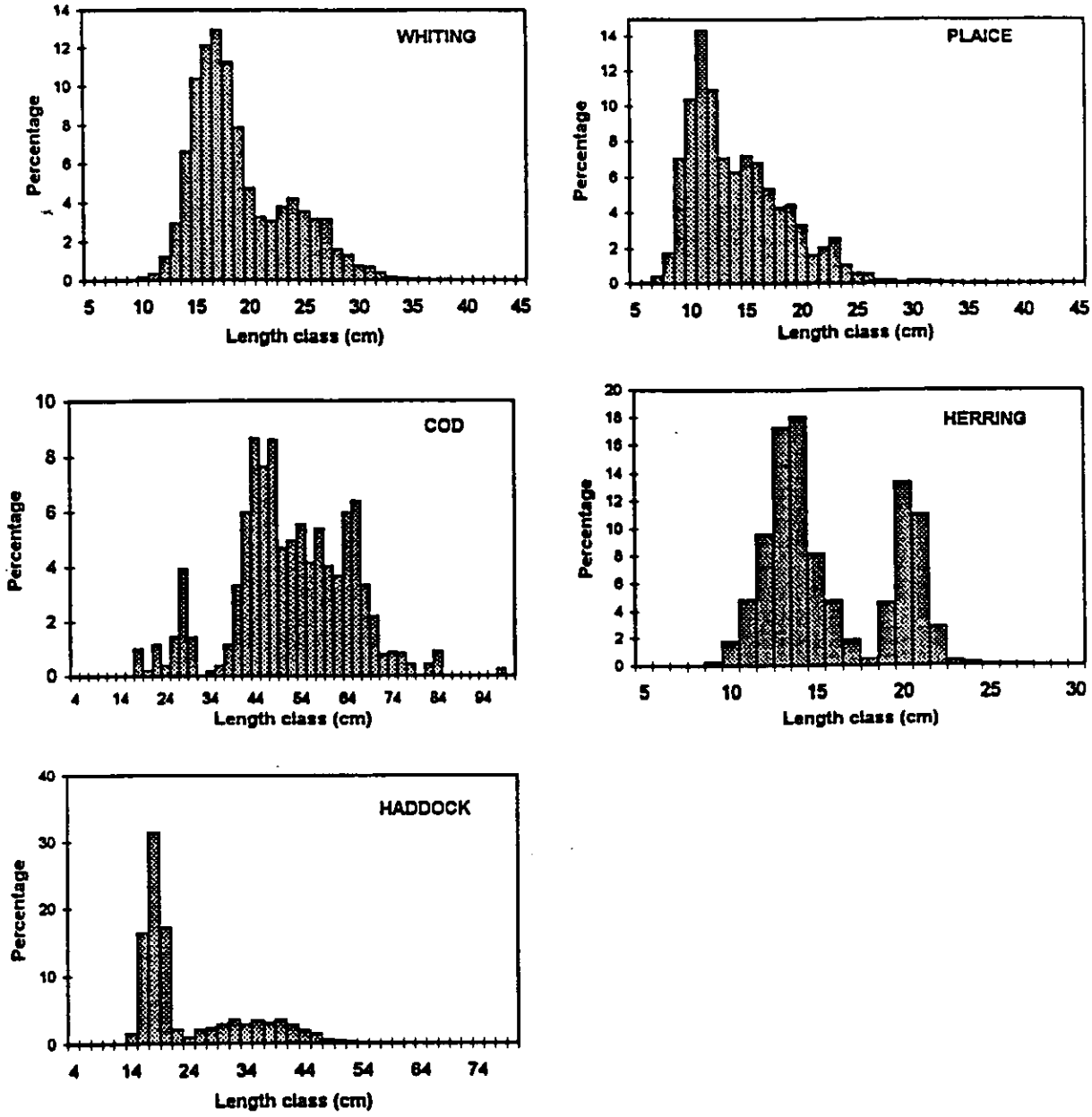

Fig. 3 Average percentage length compositions of whiting, cod, haddock, plaice and herring during cruise LF1199.