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DEPARTMENT OF AGRICULTURE [NI]
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: LF/18/93 DEMERSAL YOUNG FISH SURVEY (SUMMER)

VESSEL: R.V Lough Foyle (DANI)

DATES: 28 June - 9 July 1993

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

TYPE OF SURVEY: Otter trawl

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OBJECTIVES

1. To obtain indices of abundance of juvenile gadoids to facilitate predictions of stock-size and yield of recruited fish in future years;
2. To investigate the diets of predatory fish species in relation to the distribution and relative abundance of their fish prey, with particular emphasis on predation on commercial species;
3. To obtain further information on distribution of different age-classes of fish to facilitate interpretation of data from commercial catches;
4. To obtain samples of zooplankton and "0"-group fish for studies of the ecology and early life history of Irish Sea fish.
5. To collect samples of squid and weever fish for projects based at UUC and PEML

METHODS

A commercial Rockhopper trawl fitted with a fine-mesh liner in the cod-end was towed for one hour or three nautical miles at the stations shown in Figure 1. Gear and towing procedures were those employed on all previous DANI ground-fish surveys.

The catch at each station was sorted to species using a multiple-stage sampling procedure, and length-frequencies were recorded for each species. Subsamples of cod, whiting, hake and haddock were taken for recording of length and mass, and for removal of otoliths for ageing. Stomachs were taken from samples of predatory fish and frozen for analysis on shore.

Immediately after each station, a CTD recorder was deployed to provide information on surface and bottom temperature and salinity. Duplicate vertical hauls were also made with a bongo, net deployed from the hydrographic winch, at the end of each trawl station as well as at 5 additional bongo net stations as indicated in Figure 1.

For the purpose of analysis, the survey area was divided into seven strata defined by depth and substratum as in previous cruises (Figure 1):

Stratum	Region	Depth	Substratum
1	Ards Peninsula- North Channel	< 100m	Mixed
2	Co. Down - Dublin	< 50m	sand and finer
3	Co. Down - Dublin	50 - 100m	sand and finer
4	IOM West Coast	50 - 100m	sand and finer
5	North IOM	< 50m	coarse sediments
6	Solway Firth Liverpool Bay	< 50m	sand and finer
7	Anglesey - IOM	< 100m	coarse sediments

Although the stations mostly utilise known trawl lanes, it is emphasised that they have a semi-random distribution within each stratum, with greatest emphasis on strata in the western Irish Sea where highest densities of juvenile gadoids are expected. No trawls were made in stratum 5 because poor gadoid catches had been made here in previous surveys.

NARRATIVE

Monday 28 June: MRV Lough Foyle departed Belfast harbour at 06h.00. and proceeded south to station 86 (Figure 1) where tow 1 was performed. This was followed by stations 83,81 and 101 which were all trawled in clear calm weather conditions. Duplicate plankton samples were taken at each station except 86 where the warp meter on the hydrographic winch was faulty, preventing a second sampling. Plankton stations 2A and 2 were sampled at the end of the day and the night was spent drifting in the vicinity of station 97.

Tuesday 29 June: Tow 5 (Stn 97) was shot away at 07h.19 in calm clear weather conditions. This was followed by stations 46,99 and 48. Tow 8 (Station 48) had to be hauled a few minutes after shooting due to the presence of fixed gear, belonging to MFV Reliance, in the area. Tow 9 at station 216 was then trawled. The final task of the day was to take a plankton sample at station 3. The warp meter of the hydrographic winch appeared to be functioning normally again. The night was spent drifting off the County Down coast.

Wednesday 30 June: Work commenced at 07h.09 at station 88 followed by stations 17,100,80 and 71 in clear calm weather conditions. CTD and plankton sampling were performed before instead of after station 71 was trawled, while minor net damage incurred at station 80 was being repaired. The night was spent at anchor off Clogher Head.

Thursday 1 July: Weather calm and sunny. Work started at 07h08 with the net being shot at station 73. This was followed by stations 208,50,96 and 51. Plankton station 4 was sampled after trawling station 208. The night was spent drifting in the vicinity of station 90.

Friday 2 July: With the weather still calm stations 90,75,79,92 and 93 were trawled after which Lough Foyle proceeded to Dublin for a mid cruise break, docking at 19h.30.

Saturday 3 July: Lough Foyle remained in dock all day while essential supplies were loaded.

Sunday 4 July: Lough Foyle sailed at 08h.00 towards station 94 where the first tow was shot away at 08h.58. This was followed by stations 56, 103 and plankton station 5. At 18h.00 a boat muster drill was performed by crew and scientists. The night was spent drifting south of the Isle of Man.

Monday 5 July: The first tow (28) was at station 77 where some damage was incurred to the starboard wing of the net. This was repaired by the crew while the vessel steamed slowly to station 76, which was followed by station 242. Lough Foyle then proceeded to Laxey Bay, off the Isle of Man, where the anchor was dropped for the night.

Tuesday 6 July: Fishing commenced at 07h.15 with station 243 followed by stations 245, 246 and 247. The night was spent drifting in the region of station 249.

Wednesday 7 July: The first trawl of the day was at station 249 which was shot at 07h.10. Stations 250, 259, 257 and 64 along the Cumbria coast were then fished. A forecast of strong westerly winds for the next day resulted in the vessel steaming for shelter in Ramsey Bay, Isle of Man, for an overnight anchorage.

Thursday 8 July: The remaining two stations (258 & 256) in the survey were completed despite rapidly deteriorating weather conditions. Lough Foyle returned to Belfast during the afternoon against a strong SW wind docking at 19h.30.

RESULTS

Forty valid hauls (1 aborted) were completed from 28 June to 8 July (Figure 1). The position of trawl stations and total catch bulk at each is shown in Table 1. The quantities of selected species caught by stratum is given in Table 2 and the average whiting catch at length per 3nm trawl is presented in Figure 3. Overall around 10 tonnes of catch was sorted and length measurement was carried out on over 35,000 fish. Otoliths were taken from 122 cod, 553 whiting and 78 hake. Stomachs were removed from several hundred predatory fish and frozen for analysis of prey species. Samples of plankton from the 40 trawl stations and 5 additional plankton stations were preserved in formalin for future examination. Samples of '0' group gadoids were also preserved in ethanol for studies of juvenile fish biology. Catches of squid were frozen for a UCC project and all weever fish were retained for a PEML project on weever ecology. The WS Oceans portable CTD was deployed at the end of each trawl station giving surface and bottom temperature and salinity data.

This survey is one of three annual groundfish surveys contributing to the collection of a time-series data-base of fish distribution in north Irish Sea, employing the Lough Foyle. Indices of abundance of juvenile whiting, cod and hake from these surveys will eventually be included in the assessments of the stocks by ICES, once a sufficiently long time-series becomes available. Information on the diet of predatory fish from the analysis of the content of fish stomachs collected during the cruise will contribute towards multispecies assessment of Irish Sea fish stocks. The broad spatial coverage of surveys at three different times of the year (March, June/July and September) will provide valuable data on the seasonal distribution of fish species and indicate regions where potentially high rates of discarding of young fish could be expected. Data from plankton and juvenile fish samples collected will be used in a recently initiated project dealing with the ecology and early life history of Irish Sea fish.

ACKNOWLEDGEMENTS

I thank the Master, officers and crew of MRV Lough Foyle for their enthusiastic co-operation throughout this very successful cruise. The scientific staff are to be congratulated for their example of effective team work in completing all objectives despite the reduced length of the cruise from that originally planned.



R.P. Briggs
Scientist in Charge
8 July 1993

FIGURE 1

Map of Irish Sea showing position of stations trawled and additional plankton stations sampled during the cruise.

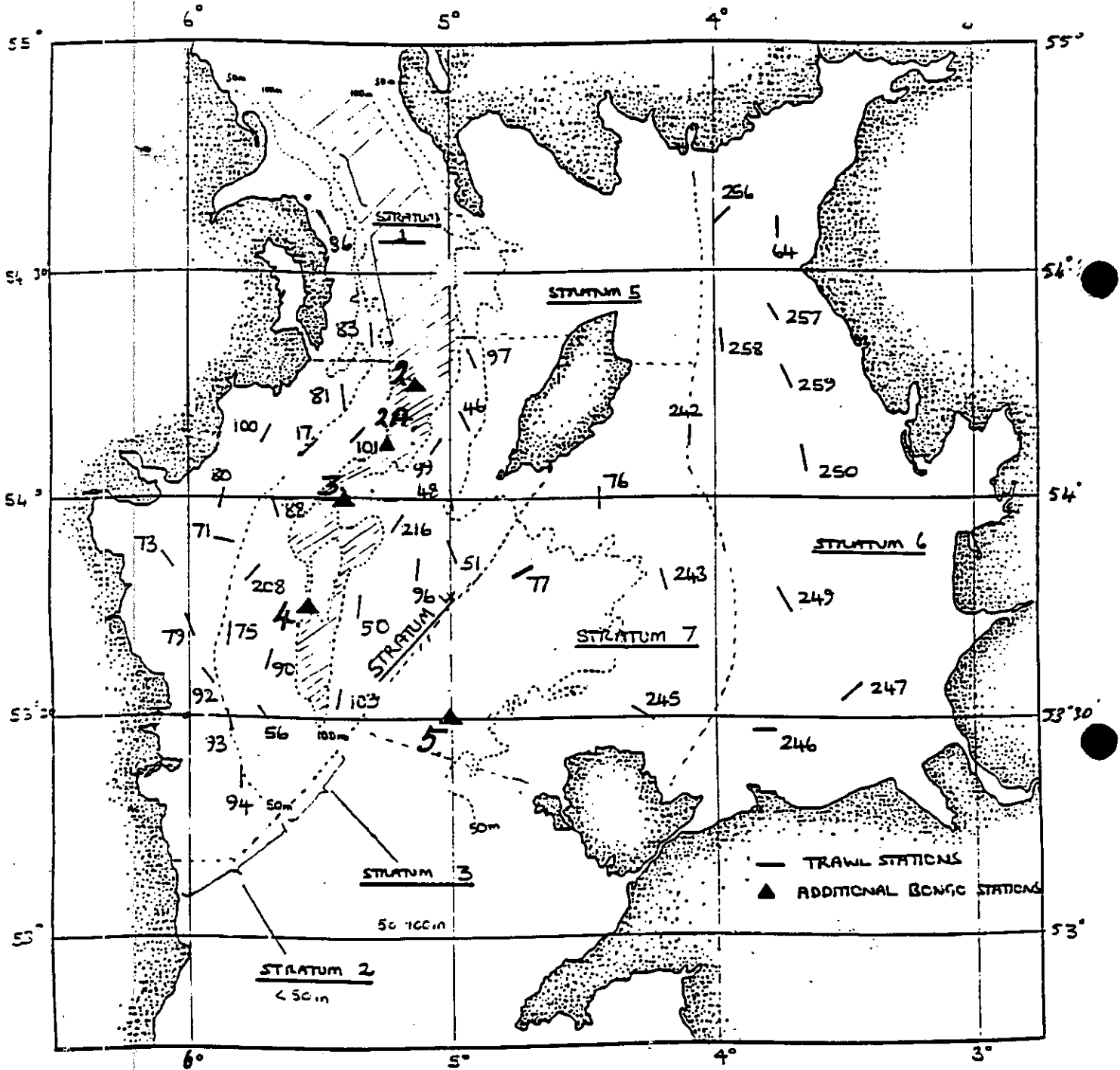
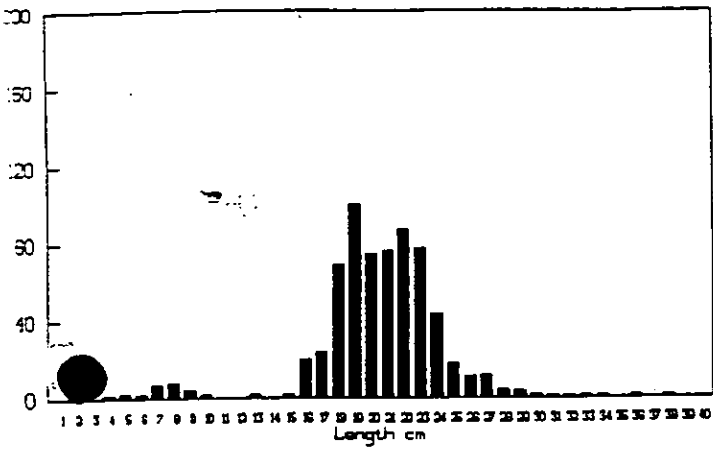


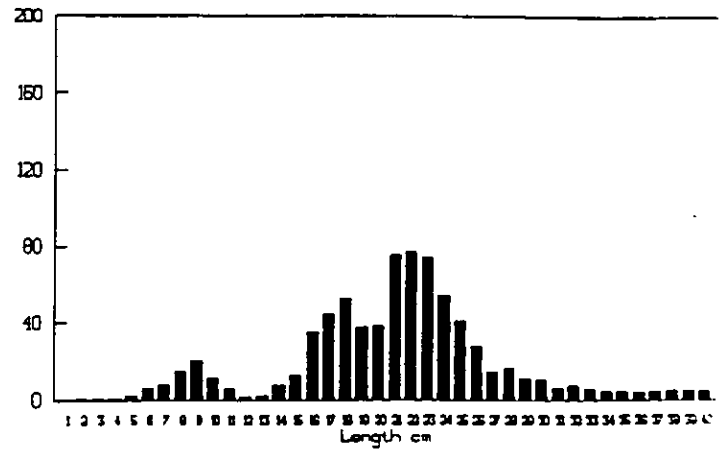
FIGURE 2

Average whiting catch number at age per 3nm trawl by strata.

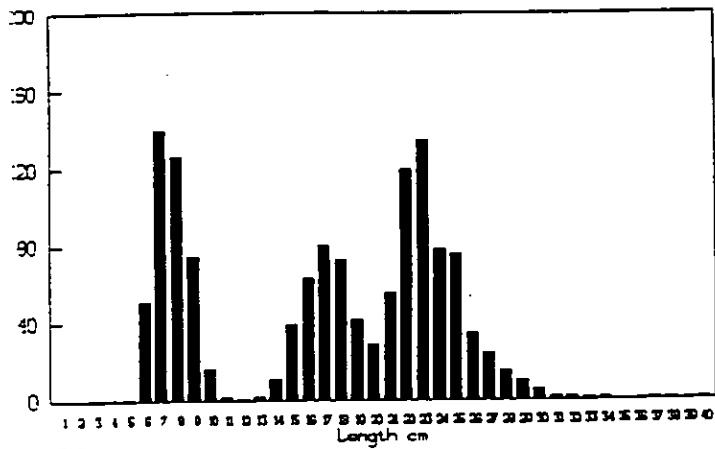
STRATUM 1



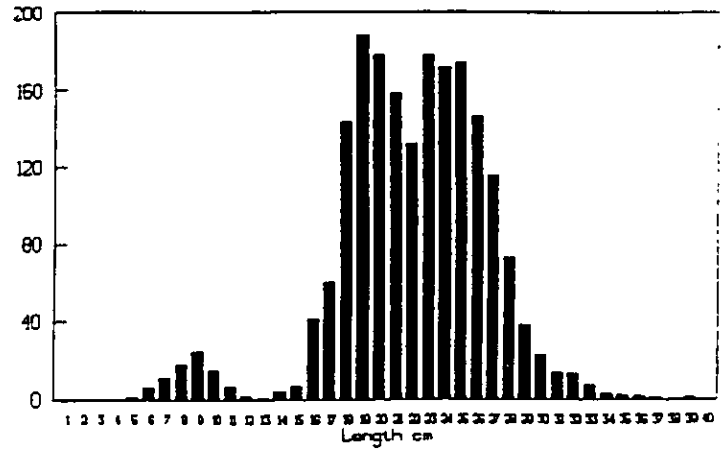
STRATUM 4



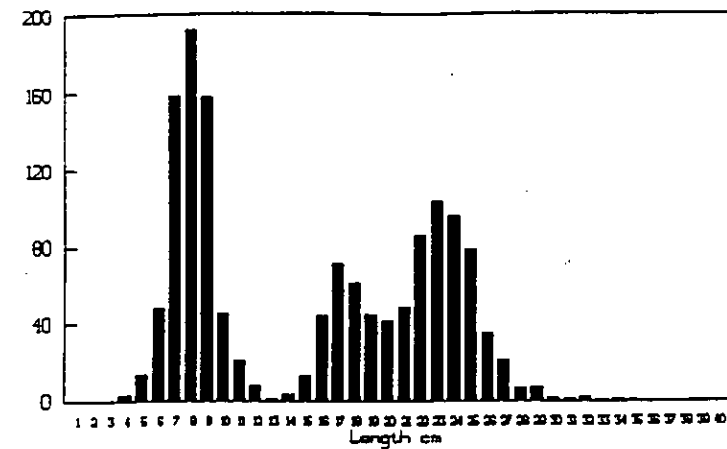
STRATUM 2



STRATUM 6



STRATUM 3



STRATUM 7

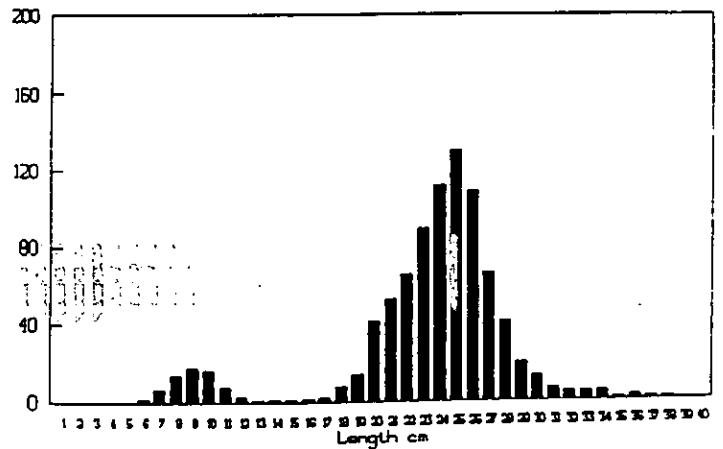


TABLE 1. Cruise LF1893 demersal fish trawl survey:

Details of trawl stations

total		S h o o t i n g				H a u l i n g				mean*	dis	fish
Date	Trawl Stn.	time (GMT)	lat.	long.	lat.	long.	depth m	tow nm	catch kg			
28 Jun	86	07.21	54 38.8	5 26.7	54 36.0	5 25.7	44	3.0	76.84			
	83	11.00	54 23.2	5 17.4	54 20.1	5 17.3	88	3.0	111.62			
	81	13.30	54 14.78	5 24.6	54 11.8	5 23.7	49	3.0	281.95			
	101	16.05	54 06.3	5 18.4	54 09.21	5 19.1	93	3.0	164.77			
29 Jun	97	06.19	54 20.6	4 55.2	54 17.6	4 53.8	77	3.0	93.79			
	46	08.50	54 11.7	4 58.3	54 08.9	4 56.0	79	3.0	180.70			
	99	11.07	54 08.2	5 00.4	54 05.9	5 03.4	80	3.0	695.40			
	48	13.35	54 01.5	4 59.4	54 00.9	4 59.2	63	0.5	aborted			
	216	14.57	53 57.5	5 11.1	53 54.7	5 13.3	64	3.0	92.22			
30 Jun	88	06.09	53 57.4	5 39.4	54 00.5	5 39.4	66	3.0	98.54			
	17	08.41	54 05.2	5 33.4	54 07.9	5 31.1	56	3.0	54.95			
	100	11.10	54 11.3	5 40.2	54 08.4	5 40.9	28	3.0	235.77			
	80	13.49	54 00.4	5 52.4	53 57.7	5 53.3	33	3.0	186.28			
	71	16.08	53 55.4	5 55.4	53 54.2	5 50.6	42	3.0	365.28			
1 Jul	73	06.08	53 51.6	6 03.1	53 49.4	6 03.0	28	3.0	119.04			
	208	08.50	53 49.9	5 44.4	53 46.8	5 44.6	70	3.0	58.04			
	50	12.22	53 44.5	5 21.1	53 47.0	5 19.0	79	3.0	421.64			
	96	14.53	53 50.1	5 07.2	53 53.0	5 06.0	64	3.0	126.59			
	51	17.11	53 53.7	4 58.4	53 50.9	4 57.8	62	2.9	284.37			
2 Jul	90	05.11	53 36.6	5 41.5	53 39.7	5 40.8	81	3.0	53.57			
	75	07.28	53 40.3	5 50.1	53 43.2	5 49.6	57	3.0	94.86			
	79	09.46	53 43.5	6 00.6	53 41.0	5 57.7	34	3.0	558.64			
	92	11.42	53 36.7	5 55.4	53 34.1	5 52.6	44	3.0	293.67			
	93	13.35	53 29.9	5 50.3	53 27.0	5 48.5	67	3.0	160.71			
3 Jul			***** cruise break in Dublin*****									
4 Jul	94	08.58	53 21.7	5 46.5	53 25.0	5 45.2	63	3.0	363.25			
	56	11.04	53 30.0	5 41.0	53 31.7	5 44.2	71	2.8	283.08			
	103	13.55	53 33.19	5 24.7	53 35.9	5 22.8	85	3.0	166.60			
5 Jul	77	06.12	53 49.3	4 43.6	53 50.4	4 39.2	54	2.8	164.00			
	76	11.50	53 59.2	4 28.6	54 00.6	4 23.7	47	3.0	147.47			
	242	15.02	54 04.5	4 01.9	54 06.5	4 04.9	32	2.7	268.24			
6 Jul	243	06.15	53 49.3	4 12.4	53 47.4	4 09.5	44	2.6	205.77			
	245	09.50	53 31.0	4 16.0	53 30.0	4 11.3	43	3.0	346.25			
	246	12.00	53 29.0	3 48.8	53 29.1	3 43.6	36	3.0	647.80			
	247	14.36	53 33.4	3 29.0	53 36.0	3 31.7	26	3.0	515.49			
7 Jul	249	06.10	53 45.8	3 40.3	53 47.9	3 43.9	33	3.0	271.46			
	250	09.15	53 03.3	3 37.4	53 06.1	3 39.0	26	3.0	417.46			
	259	11.40	54 15.0	3 40.3	54 17.6	3 42.4	36	3.0	103.34			
	257	13.49	54 24.2	3 43.8	54 26.9	3 46.0	29	3.0	129.47			
	64	16.00	54 35.4	3 43.7	54 38.1	3 45.6	20	3.0	219.26			
8 Jul	258	06.07	54 22.4	3 58.4	54 20.0	3 56.1	39	2.6	481.10			
	256	10.11	54 37.8	3 55.8	54 36.0	3 59.0	30	2.8	414.27			

Catches of Selected species in kg per tow

STRATUM 1		
SPECIES	86	83
COD	4.84	1.31
WHITING	21.44	81.49
HAKE		6.78
BIB		
HADDOCK		
P. COD	.94	8.65
N. POUT		1.82
HERRING	27.64	3.15
SPRAT		.01
PLAICE		.12
DAB	.06	
G. GURNA	.04	.42
LS DOGS	17.74	1.59
SPURDOG		
SCAD		.49
MACKERA	1.05	.77
ANGLER		
NEPHROPS		
SQUID	.07	.09
OTHER	3.04	2.93
TOTAL	76.84	111.62

STRATUM 2									
SPECIES	81	100	79	73	71	92	94	80	
COD		.21	.04		.03	1.02	8.65	4.40	
WHITING	31.76	16.46	57.23	17.48	10.72	224.09	320.02	96.35	
HAKE	4.37	.38			.32			2.48	
BIB									
HADDOCK	.14	.02	.72	.23	.24	23.06	5.12	.57	
P. COD	.58	5.48	.35	.27	.21	2.89	3.22	8.61	
N. POUT	.09				.23	3.87	3.96	.10	
HERRING	121.58	3.44	31.76	2.46	81.63	3.77	2.64	5.73	
SPRAT	105.55	153.50	455.51	94.54	244.60	8.69		40.35	
PLAICE	.22	28.30	7.04	.93	18.77	4.60	1.56	7.42	
DAB	.13	15.55	.87	.66	1.27	.66	3.67	.85	
G. GURNARD	1.10	.63	.61			.54	.09	.05	
LS DOGS	4.24	2.86					1.78	9.06	
SPURDOG						13.37			
SCAD	.25	1.14						.41	
MACKERAL							1.71	.64	
ANGLER		.51					.13	1.31	
NEPHROPS	1.98	.46	.01	.95	1.81	1.48		.31	
SQUID	.41	4.37	.15	.48	.39	.18		.31	
OTHER	9.56	2.47	4.35	1.04	4.98	5.46	8.72	7.99	
TOTAL	281.95	235.77	558.64	119.04	165.20	293.67	363.25	186.63	

STRATUM 3								
SPECIES	101	17	208	75	90	56	93	88
COD	1.63	2.51	1.13	1.19	7.74	14.83	9.56	2.95
WHITING	55.49	20.05	12.09	59.54	35.67	229.79	78.26	48.58
HAKE	1.36	.19	.07	.51	.92	.51	.49	.77
BIB							.32	
HADDOCK	.01	.03	.04	.78	.04	2.82	1.28	.02
P. COD	2.17	.63	.56	.97	.23	.55	14.42	.28
N. POUT	74.24	.65	1.54	.95	6.01	7.73	21.17	3.90
HERRING	5.22	10.03	23.15	18.76	.66	4.24	8.01	2.42
SPRAT	3.35	3.08	8.74	1.24	.02	.41	.02	.04
PLAICE						1.81	3.08	
DAB	.07	1.07		.71		.58	1.34	.28
G. GURNARD	.80	.46	.92	.47	.92	1.46	.40	1.36
LS DOGS								.83
SPURDOG				.43	.47	.22	.47	
SCAD								
MACKERAL								
ANGLER		2.56	.51		.51			
NEPHROPS	14.63	8.70	6.32	.59	1.79	17.08	12.88	31.92
SQUID	.55	.35	.01	.49	.01	.49		.26
OTHER	5.28	4.67	2.98	8.24	.08	1.56	9.25	5.21
TOTAL	164.77	54.95	58.04	94.86	53.57	283.08	160.71	98.54

STRATUM 4								
SPECIES	46	99	216	96	51	50	103	
COD	4.13	.06	.04	3.35	4.41	9.89	22.87	13.82
WHITING	44.25	124.20	69.65	21.07	29.82	119.29	346.65	95.08
HAKE	4.84	10.00	9.08	10.25	16.81	14.23	1.61	2.29
BIB			.41	.55		2.92		2.92
HADDOCK		.01	.00		.00	26.89	.00	9.86
P. COD		2.80	3.88	3.12	6.40	21.68	4.52	19.14
N. POUT	11.49	3.90	6.00	7.06	1.76	14.21	4.16	4.62
HERRING	1.49	2.80	11.00	1.50	.71	30.59	.77	5.12
SPRAT					1.60	.01	1.60	.01
PLAICE						1.30		2.98
DAB						.71		.47
G. GURNARD	.92	6.18	.56	2.23	2.60	3.71	.28	9.10
LS DOGS	1.56	1.54		.19		24.75		24.75
SPURDOG						.94		.94
SCAD	.24	.25	1.11	.30	.66	1.02	2.48	.38
MACKERAL						.31		1.22
ANGLER			1.75		3.91	1.50	3.91	1.50
NEPHROPS	10.97	21.21	30.66	39.37	42.25	4.55	15.28	.27
SQUID	.06	.01	.02	.03		.33		.23
OTHER	5.83	7.70	4.42	3.21	15.44	5.88	22.83	2.28
TOTAL	93.79	180.65	138.57	92.22	126.59	284.37	421.64	166.60

STRATUM 6										
SPECIES	242	246	247	249	250	259	257	64	258	256
COD					2.38	.09	.24		18.28	5.77
WHITING	92.82	272.70	261.64	101.29	327.02	75.51	68.69	132.20	367.50	199.26
HAKE		.36						.30		
BIB		6.82	3.52	2.47	.41		2.96	1.17	8.29	.22
HADDOCK							.01		.01	
P. COD	7.10	60.93	3.97	9.17	10.08	5.42	6.01	.72	18.10	.22
N. POUT			.08						.33	
HERRING	3.70	80.67	20.77	1.94	13.22	1.34	12.46	3.85	3.90	94.29
SPRAT				.57	3.67	.53	3.72	35.12	.26	11.19
PLAICE	1.93	7.97	7.89	16.95	6.71	.99	4.57	1.98	9.30	41.15
DAB		2.84	6.53	27.12	15.81	.38	1.06	14.63	6.93	5.12
G. GURNARD		.61	.73	.97	.68		4.46	.31	.22	5.12
LS DOGS	105.41	148.35	85.53	5.83			4.16	12.26	25.23	10.35
SPURDOG	9.28			5.22						2.17
SCAD		.45	1.91				.16			.22
MACKERAL	1.00	.41	.27	.86	.60	.30	.64			29.43
ANGLER	.80	2.50								
NEPHROPS					2.09	14.29	1.84	.05	10.44	.39
SQUID	3.02	2.65	1.19	.06	.07	.06	.98	1.06	.41	2.42
OTHER	43.18	60.55	121.45	99.04	34.72	4.44	21.52	15.63	11.91	6.97
TOTAL	268.24	647.80	515.49	271.46	417.46	103.34	129.47	219.26	481.10	414.27

STRATUM 7				
SPECIES	76	243	245	77
COD	.97	12.51	6.60	3.12
WHITING	.73	55.60	292.00	31.82
HAKE	.85			3.15
BIB		7.30	3.25	1.40
HADDOCK	1.44	.01		8.20
P. COD	1.43	10.80	9.61	34.96
N. POUT		.05	.14	
HERRING	11.21	.78		4.31
SPRAT				
PLAICE		.21	.51	1.15
DAB			.93	.74
G. GURNA	.54	.98		4.36
LS DOGS	90.10	54.56	25.11	43.23
SPURDOG	1.58	5.85		
SCAD	.52	.24		1.14
MACKERA	.30			
ANGLER	.72			
NEPHROPS				
SQUID	1.89	.49		1.18
OTHER	35.00	56.43	11.35	26.19
TOTAL	147.47	205.77	149.49	164.93