DEPARTMENT OF AGRICULTURE [NI]
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: LF/20/92 DEMERSAL YOUNG FISH SURVEY (AUTUMN)

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

DATES: 4 - 18 September 1992

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

TYPE OF SURVEY: Otter trawl

PERSONNEL:

R. Briggs,	PSO [SIC]
W. McCurdy,	SSO
C. Reavey,	SO (until 9 September)
A. Hayes,	ASO
J. Peel,	ASO
P. Dunwoody,	TSTUD
M. Collins,	Visitor UCC

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 gather information on distribution and relative abundance of squid.

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.

All squid from catches were sampled and quantified by Mr Collins. Statocysts were removed from larger animals while small specimens were preserved for further study at University College Cork after the cruise. The eyeballs and samples of body organs were also taken from several whitings for use in a UCC genetics project.

Immediately after each station (weather permitting), a CTD recorder was deployed to provide information on surface and bottom temperature and salinity.

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.

Data collected during the cruise were logged using the 'GFSIN' software package run on one of the ship's Tandon computers.

NARRATIVE

Friday 4 September: *MRV Lough* Foyle departed Belfast harbour at 22h.00. and proceeded southwards. The Fishing Master gave a comprehensive demonstration of emergency procedures to the scientific staff on the evening of departure and there was a short pre-cruise briefing session for the scientific staff.

Saturday 5 September: Weather calm. Fishing started at 07h.00 local time at station 81 off Ardglass (Figure 1). This was followed by stations 205, 101, 17 and 100. Catches contained a high proportion of very small gadoids and clupeoids. A poor forecast lead to *Lough Foyle* sheltering overnight in Carlingford Lough.

Sunday 6 September: Strong southern winds prevented work commencing as planned with the vessel remaining at anchor in Carlingford Lough until late morning. A slight improvement in the weather enabled the vessel to resume work at 12h.55. An attempt to fish station 80 was aborted due to an abundance of poorly marked static fishing gear all over the station. A successful trawl at station 70 (merged with station 87 of earlier surveys) was followed by one at station 203. Weather conditions were poor during these tows and consequently the CTD was not deployed. A further deterioration of the weather lead to the decision to make for shelter off Skerries where the ship lay at anchor overnight.

Monday 7 September: A movement of the prevailing winds to the west meant work could continue with the relatively inshore stations 79,78,73,71,11,and 208 being completed despite somewhat unfavourable weather. The vessel returned to an anchorage off Clogher Head for the night.

Tuesday 8 September: Commencing at 06h.47, five stations were completed (89, 75, 92, 93 and 56) with a moderate breeze of 25-30 mph prevailing throughout the day. The vessel moved slowly northward to 54°19'N through the night in readiness to fish station 97 on the Wednesday morning.

Wednesday 9 September: Weather SSW winds (average 30mph) and overcast. Work commenced at 07h.00 with station 97 to the west of the Isle of Man. This was followed by stations 46,99,48 and 51. Station 51 contained a large bulk of jellyfish which were discarded leaving only a small fish sample (36.2kg) for this

station. Due to forecasts of worsening weather *Lough Foyle* then returned to an anchorage off Skerries for the night.

Thursday 10 September: Gales throughout the Irish Sea caused the vessel to remain at anchor off Skerries all day. A successful boat drill was organised by the Master at 14h.00

Friday 11 September: A movement of prevailing winds to the west enabled one station (90) to be trawled before the *Lough Foyle* set course for Dublin for water and supplies. *Lough Foyle* docked into Dublin at 15h.00.

Saturday 12 September: The vessel remained at berth in Dublin throughout the day. The crew replaced the badly worn lifter bag of the net by a new one of the same dimensions. Mr Reavey left the ship and returned home.

Sunday 13 September: The *Lough Foyle* cast off at 06.50 and proceeded to station 94 off Dublin. This was followed by stations 95,103,50 and 98 in light winds from the west(15-20mph).The night was spent drifting in the vicinity of station 216 off the west coast of the Isle of Man.

Monday 14 September: Trawling commenced at station 216 at 06h.50 followed by stations 96,51,77,76 and 243. Stations 216,96 and 32 gave large catches of jellyfish along with a small mixed fish catch. Half the bulk of these tows were 'slipped'prior to landing and it may be necessary to make adjustments to catch bulk data in future analysis. The catch from station 76 off the Isle of Man was rich in pre-spawning herring
(448kg). The night was spent anchor in Dulas Bay on the Anglesey coast.

Tuesday 15 September: Strong winds from the SW prevented trawling. The vessel remained at anchor in Dulas Bay throughout the day.

Wednesday 16 September: A marked improvement in the weather enabled station 245 off Anglesey to be fished in calm conditions. This was followed by four more stratum 6 stations (246,249,250 and 259). An abundance of jellyfish could have affected catch rates at these stations; especially stations 249 and 250. The night was spent at anchor off Whitehaven.

Thursday 17 September: The day was spent trawling stations 64, 256,257 and 258 in a moderate southern breeze (15-20mph). *Lough Foyle* then proceeded through the night to an anchorage off Peel, Isle of Man.

Friday 18 September: The anchor was lifted at 04h.00 and the vessel proceeded to the County Down coast to trawl station 83 off Portavogie. This was followed by stations 86 and 35. Weather conditions were calm with some mist. The survey was

completed at around 12h.30 and the vessel then dodged off Kilroot while this last station was being sorted before returning to Belfast harbour. *MRV Lough Foyle* docked at 14h.42.

RESULTS

Forty six hauls were completed from 5 - 18 September (Figure 1). The position of trawl stations and total fish catch at each is shown in Table 1. The quantities of selected species caught by stratum is given in Table 2 and the mean whiting catch at length per 3 mile tow is shown in Figure 2. The total whiting CPUE by stratum is given in Figure 3. Over fifty percent of the total amount of fish caught (1100 tonnes) was sorted to species level and length measurement was carried out on over 41,000 fish. Otoliths were taken from 162 cod,373 whiting and 96 hake. Stomachs were removed from 1,184 fish and frozen for analysis of prey species. Catches of squid were identified to species, measured and stomachs removed from around 200 specimens by Mr Collins. Squid samples were also frozen for future study at UCC.

The WS Oceans portable CTD was deployed at the end of each trawl station except when weather conditions were thought to be a threat to the instruments safety (Stations 70,208,79,51, 94). Erroneous readings due to poor connections were obtained at station 90; this fault was promptly rectified but occurred again on the last day of the cruise.

This survey is a repeat of the summer survey (LF/16/92) and is part of the time-series of young fish surveys of the western 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. Information on the distribution of young gadoids will also be used in the forthcoming study of technical conservation measures.

ACKNOWLEDGEMENTS

Sincere thanks are extended to the Captain, Officers and Crew of the Lough Foyle for their cooperation throughout the cruise. The scientific staff are acknowledged for their example of team work and precision in processing a very large number of samples under rather inclement weather conditions.

Signed:

Scientist in charge.....date 18:9:92

Ships Master.....date 18.09.92.

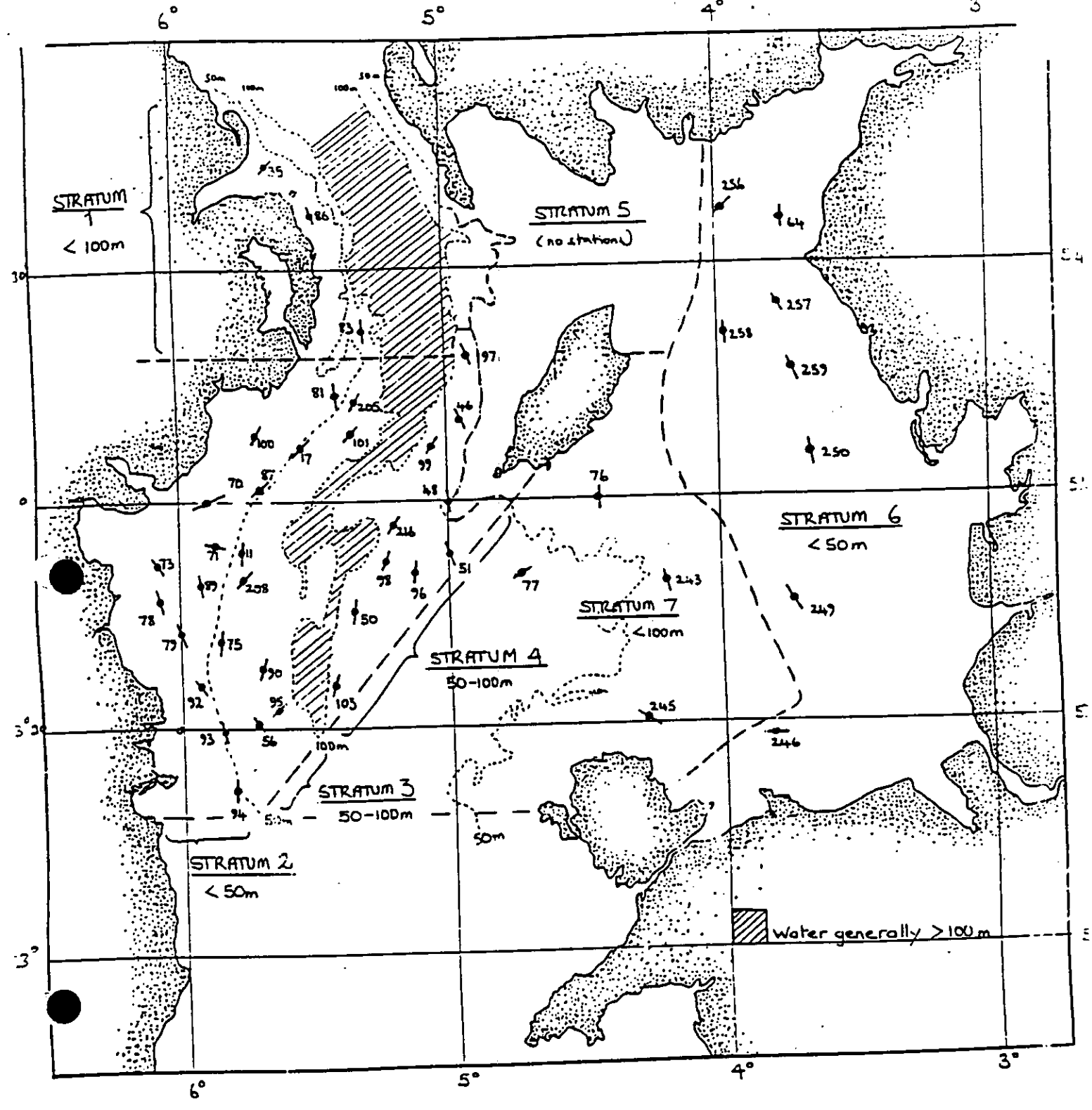
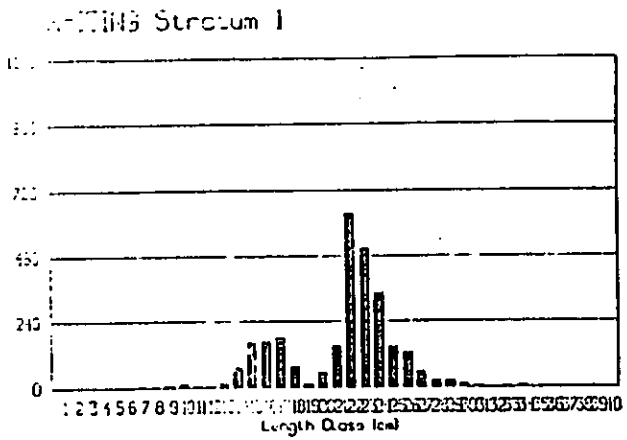
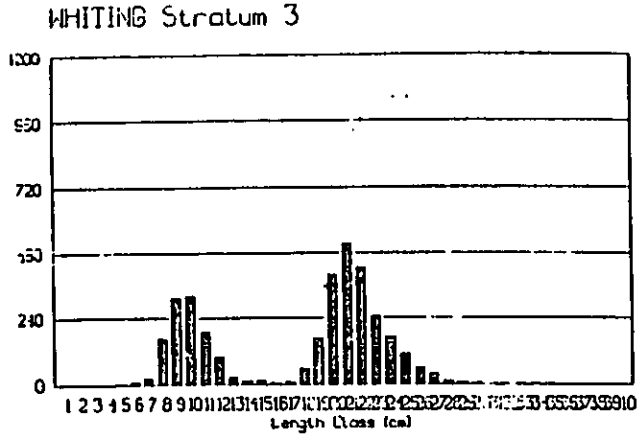
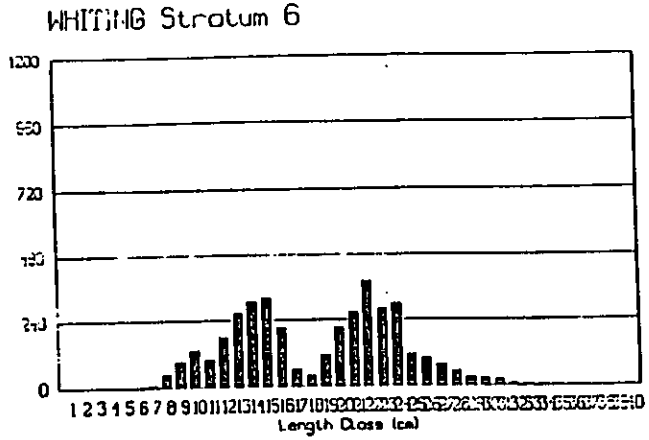


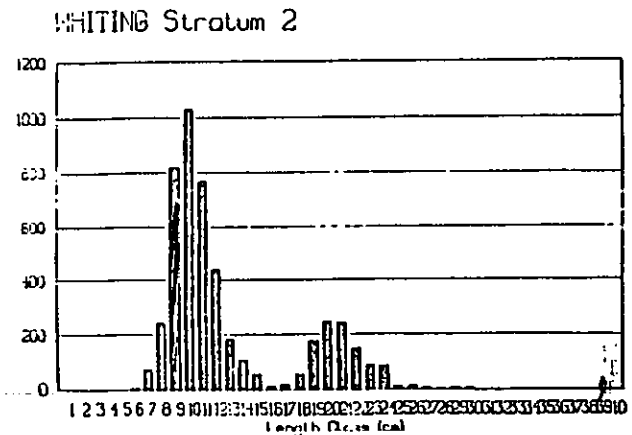
Figure 1. Trawl stations fished during the September 1992 groundfish survey on *R.V.Lough Foyle*, showing the division of the area into strata on the basis of depth and sediment type. No stations were fished in Stratum 5 due to poor catches in previous surveys.

Figure 2 Whiting catch at length per 3 hour tow by strata (adjusted for short tow stations). Stratum 7 is ommitted due to low catches.









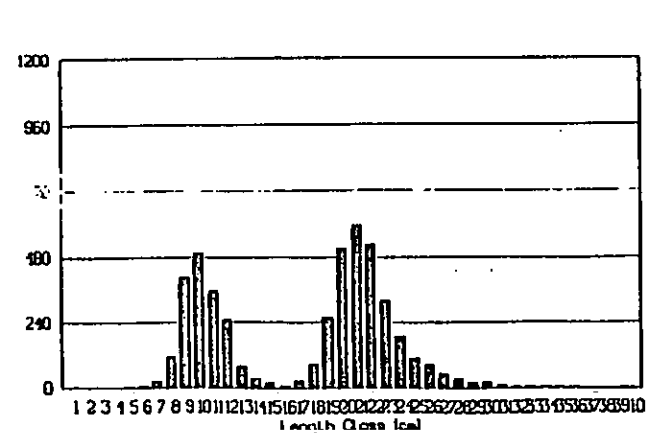


Figure 3

Combined whiting catch per 3 hour tow for each stratum.

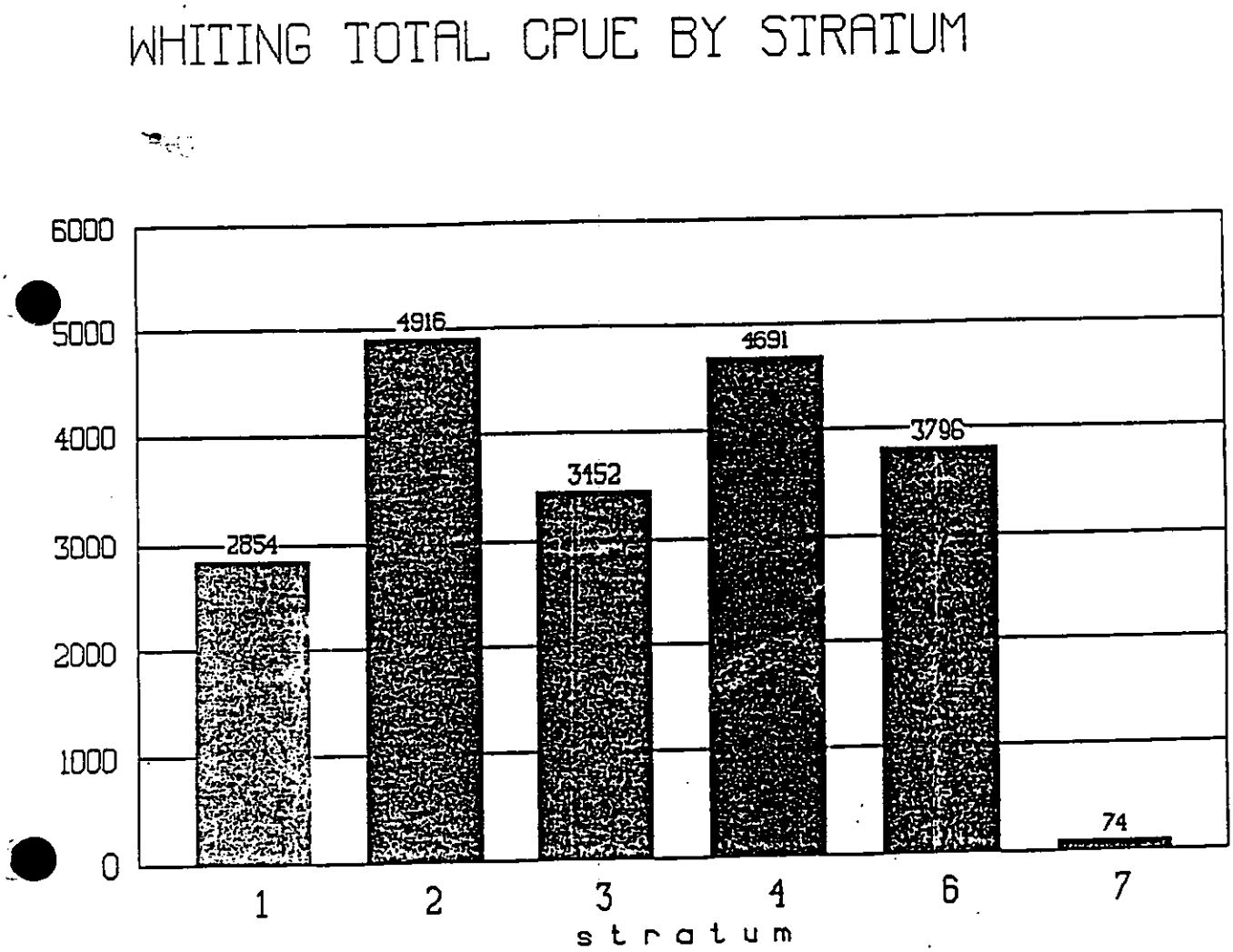


Table 1. Cruise LF1692 demersal fish trawl survey:

Details of trawl stations

	Shooting			Hauling					
Date	Trawl Stn.	time	lat.	long.	lat.	long	mean* depth m	dis tow nm	total fish catch kg
5 Sept	81	6.03	54 14.9	5 24.2	54 11.6	5 23.9	50	3.2	233.5
	205	8.12	54 12.9	5 19.8	54 15.5	5 17.9	64	3.0	135.5
	101	10.30	54 09.5	5 19.0	54 19.1	5 19.1	82	2.9	199.3
	17	13.00	54 08.1	5 30.5	54 05.3	5 33.0	54	3.0	374.7
	100	15.29	54 11.2	5 40.1	54 08.8	5 39.2	27	2.7	100.0
6 Sept	70	12.55	54 02.6	5 45.0	53 59.7	5 45.4	39	3.0	152.5
	203	15.05	53 57.5	5 49.5	53 54.6	5 50.4	44	3.0	78.6
7 Sept	79	6.47	53 41.5	5 59.3	53 44.7	5 59.6	33	3.0	262.4
	78	8.38	53 46.0	6 04.2	53 49.4	6 03.9	28	3.1	166.8
	73	10.36	53 50.7	6 5.3	53 51.6	6 09.1	25	3.0	259.4
	71	13.15	53 54.5	5 54.9	53 54.6	5 50.0	41	3.0	178.3
	11	15.06	53 54.2	5 46.1	53 51.1	5 44.8	59	3.0	170.6
	208	16.51	53 50.7	5 44.9	53 48.0	5 46.9	59	3.0	566.8
8 Sept	89	6.47	53 50.7	5 56.0	53 48.0	5 54.5	40	3.0	180.7
	75	9.25	53 41.9	5 50.4	53 39.0	5 50.1	58	3.0	247.8
	92	11.36	53 36.5	5 55.7	53 33.9	5 33.9	41	3.0	449.3
	93	13.36	53 30.8	5 50.6	53 28.2	5 48.1	66	3.0	541.9
	56	16.04	53 31.4	5 41.3	53 29.7	5 38.6	78	3.0	146.8
9 Sept	97	7.10	54 19.5	4 54.9	54 16.6	4 53.5	70	3.0	394.7
	46	9.45	54 12.2	4 57.4	54 09.9	5 00.6	87	3.0	111.8
	99	10.42	54 08.5	5 01.5	54 04.9	5 04.9	88	3.0	398.8
	48	13.22	54 01.0	5 00.0	53 58.4	4 58.6	56	3.0	206.0
	51	15.36	53 53.9	4 58.8	53 51.1	4 57.1	70	3.0	36.2
10 Sept			no fishing - strong winds						
11 Sept	90	10.00	53 39.5	5 41.8	53 36.6	5 41.1	79	3.0	97.0
12 Sept			docked in Dublin						
13 Sept	94	8.50	53 21.6	5 46.7	53 25.3	5 46.7	72	3.0	238.7
	95	10.50	53 31.4	5 38.5	53 34.1	5 35.8	95	3.0	71.0
	103	13.35	53 34.0	5 24.7	53 36.8	5 22.1	83	3.0	288.5
	50	15.03	53 44.8	5 21.1	53 47.5	5 18.8	78	3.0	136.1
	98	18.29	53 51.2	5 14.7	53 53.9	5 12.8	64	3.0	314.6
14 Sept	216	6.50	53 57.7	5 10.4	53 54.9	5 12.2	60	3.0	87.2
	96	9.01	53 51.5	5 06.4	53 48.6	5 06.9	64	3.0	38.6
	77	11.58	53 49.9	4 43.2	53 51.6	4 39.1	73	3.0	135.4
	76	14.31	53 59.5	4 29.4	54 00.6	4 24.7	46	3.0	508.5
	243	17.38	53 49.6	4 09.9	53 46.8	4 07.4	45	3.0	187.7
15 Sept			No trawling - SW gales						
16 Sept	245	06.45	53 31.5	4 17.3	53 30.2	4 13.4	42	2.6	119.5
	246	08.37	53 29.0	3 47.7	53 29.1	3 43.2	34	3.0	212.7
	249	11.27	53 46.6	3 40.7	53 48.8	3 44.1	37	3.0	127.9
	250	15.29	54 04.0	3 37.7	54 05.7	3 39.0	33	1.7	369.0
	259	17.23	54 15.6	3.40.9	54 18.1	3 43.0	35	3.0	594.9
17 Sept	64	06.50	54 35.5	3 44.9	54 38.4	3 45.8	22	3.0	365.4
	256	08.06	54 38.3	3 56.0	54 35.8	3 59.4	31	3.0	323.7
	258	11.04	54 21.9	3 57.3	54 18.9	3 55.8	38	3.0	459.8
	257	15.34	54 24.1	3 42.9	54 26.6	3 45.9	29	3.0	159.4
18 Sept	83	6.40	54 20.9	5 17.3	54 24.1	5 18.1	91	3.0	51.8
	86	9.10	54 34.7	5 25.3	54 37.8	5 26.4	41	3.0	337.8
	35	11.46	54 44.3	5 38.3	54 43.3	5 41.5	16	2.2	540.2

* mean of shooting and hauling depth

RATUM 1

SPECIES	STATION NUMBER 83	86	35
COD	-	31.4	0.29
WHITING	24.90	213.2	415.60
HAKE	0.79	1.47	-
BIB	-	21.04	1.62
HADDOCK	-	-	-
P.COD	11.81	20.68	10.54
N.POUT	4.77	0.05	-
HERRING	0.33	0.31	9.38
SPRAT	0.16	0.02	67.09
PLAICE	-	0.52	0.24
DAB	0.09	-	0.27
G.GURNARD	-	0.35	0.69
LS DOGFISH	2.61	37.12	-
SPURDOG	3.69	-	-
SCAD	0.32	0.16	5.67
MACKERAL	0.47	-	2.51
ANGLERFISH	0.66	-	22.50
NEPHROPS	0.34	-	-
SQUID	0.47	-	-

STRATUM 2

SPECIES	STATION NUMBER 81	100	70	203	79	78	73	71	89	92	94
COD	-	1.18	-	-	0.04	-	-	-	-	0.11	7.56
[illegible]NG	115.99	85.10	95.18	59.05	224.50	104.36	178.18	133.3	162.6	333.79	165.32
[illegible]	0.78	-	1.67	0.43	-	-	-	-	-	-	-
BIB	0.15	-	-	-	-	-	-	-	-	-	-
HADDOCK	0.58	16.68	2.86	0.42	0.11	-	-	-	-	4.05	-
P.COD	5.91	0.08	0.55	0.05	0.31	0.06	0.30	0.15	0.12	2.53	9.52
N.POUT	23.97	0.02	0.19	0.77	0.09	-	-	1.63	1.09	4.91	5.53
HERRING	33.05	1.32	0.20	0.46	0.34	4.52	9.48	0.97	1.24	17.66	0.28
SPRAT	35.60	5.30	7.76	10.32	0.31	40.58	53.60	36.02	1.02	-	0.05
PLAICE	0.17	39.00	12.58	0.53	8.48	5.54	0.74	0.96	1.84	12.80	30.36
DAB	0.87	29.00	7.35	1.35	8.99	1.12	2.04	1.06	2.07	2.59	2.02
G.GURNARD	0.07	2.13	3.70	1.36	-	1.59	0.36	0.51	0.32	2.30	0.20
LS DOGFISH	2.70	-	4.67	0.57	4.92	-	-	-	-	34.50	12.09
SPURDOG	-	-	-	-	-	-	-	-	-	-	-
SCAD	1.61	0.47	0.53	-	0.68	1.47	-	-	7.41	17.02	-
MACKERAL	3.72	1.19	3.20	0.61	0.69	-	2.4	2.08	0.07	6.58	-
ANGLERFISH	0.82	-	-	-	0.13	-	-	-	-	-	-
NEPHROPS	3.35	0.11	0.97	4.79	18.00	21.90	14.72	24.34	26.92	5.30	0.12
SQUID	5.4	2.46	-	0.28	0.93	2.56	8.04	7.42	1.29	-	0.15

STRATUM 3

SPECIES	STATION NUMBER 205	101	17	11	208	75	90	56	93	95
[illegible]	-	-	-	0.83	-	1.68	2.52	13.82	4.79	20.00
[illegible]NG	110.8	103.56	144.00	104.77	454.87	201.50	53.56	65.95	453.01	23.67
HAKE	-	1.89	13.36	-	1.14	1.25	3.13	1.12	-	-
HADDOCK	0.79	-	0.29	1.62	-	0.45	6.09	13.99	3.41	0.38
BIB	-	-	-	-	-	-	-	-	-	-
P.COD	5.27	1.98	1.08	0.64	1.94	1.03	0.50	4.56	7.13	1.76
N.POUT	7.88	5.53	32.95	22.10	85.60	11.35	25.25	20.04	-	21.98
HERRING	1.77	1.08	10.56	0.31	1.67	6.15	0.16	0.86	32.73	0.65
SPRAT	0.99	-	140.80	29.38	2.19	-	0.06	-	-	0.06
PLAICE	-	-	-	0.80	-	-	-	3.59	0.40	0.72
DAB	0.01	-	1.13	1.73	-	0.18	-	-	0.14	0.35
G.GURNARD	-	-	-	1.03	0.22	0.10	0.06	-	1.54	-
LS DOGFISH	1.73	10.00	12.65	-	-	-	-	3.87	135.50	-
SPURDOG	-	3.12	2.59	-	-	-	-	-	-	-
SCAD	0.46	41.88	-	1.48	0.32	16.44	5.60	30.00	12.58	0.48
MACKERAL	0.75	-	6.33	1.86	6.76	0.62	0.06	0.21	0.55	-
ANGLERFISH	2.15	5.73	-	3.14	8.88	-	-	-	-	-
NEPHROPS	5.64	3.29	5.42	-	9.65	30.83	0.11	13.20	0.78	1.81
SQUID	1.01	2.41	2.98	16.8	15.24	1.29	1.51	0.62	70.0	-

STRATUM 4

SPECIES	STATION NUMBER 97	46	99	48	216	98	96	51	50	103
COD	-	0.36	-	1.12	0.01	0.88	-	0.39	2.36	30.79
WHITING	304.0	51.44	343.93	62.98	63.96	204.46	21.85	6.45	58.45	74.76
HAKE	4.03	4.11	4.21	5.94	1.03	3.08	-	0.56	4.84	5.52
HADDOCK	2.02	-	-	6.41	-	-	-	5.48	-	0.69
BIB	-	-	-	-	-	-	-	-	-	-
P.COD	1.67	0.63	2.84	54.00	0.28	0.73	2.59	8.11	11.87	7.12
N.POUT	33.60	5.33	10.67	35.13	10.43	9.61	1.20	4.63	23.38	40.00
HERRING	6.66	-	0.23	3.97	0.33	1.86	-	-	-	-
SPRAT	0.09	0.01	0.04	-	2.68	1.83	0.05	-	-	-
PLAICE	-	-	-	-	0.14	-	0.51	0.35	0.78	0.93
DAB	-	-	-	-	0.05	-	-	0.08	-	0.84
G.GURNARD	-	-	-	1.74	0.38	1.25	0.22	0.49	0.62	0.06
LS DOGFISH	20.14	-	-	28.4	-	13.43	3.41	7.93	0.90	18.00
SPURDOG	-	23.00	3.67	93.00	0.87	11.18	6.61	16.00	18.50	86.50
SCAD	-	-	-	-	0.18	4.22	0.93	-	65.00	5.34
MACKERAL	-	-	-	-	0.80	72.00	0.06	0.23	7.03	-
ANGLERFISH	0.70	-	3.35	1.54	-	-	0.22	-	5.22	-
NEPHROPS	0.22	4.83	18.01	0.72	4.00	15.99	1.75	56.00	15.83	0.04
SQUID	1.15	-	-	8.61	0.40	-	0.22	0.36	0.98	-

STRATUM 6

SPECIES	STATION NUMBER 256	64	259	250	249	246	257	258
COD	0.77	-	-	2.15	7.35	36.15	0.01	6.72
WHITING	249.25	242.01	498.16	305.65	39.03	124.50	125.57	326.40
HAKE	-	-	-	-	-	2.66	-	-
HADDOCK	0.02	-	-	-	-	-	-	-
BIB	0.77	6.93	7.14	0.29	-	0.18	5.30	3.02
P.COD	12.69	0.50	16.82	2.03	-	-	2.32	24.75
N.POUT	0.01	-	0.30	-	0.04	-	0.07	0.07
HERRING	1.06	10.31	0.91	9.77	8.06	0.20	0.18	0.62
SPRAT	0.90	8.71	4.77	7.49	-	0.03	0.24	0.41
PLAICE	21.32	21.12	17.24	12.97	27.00	4.39	1.32	11.10
DAB	27.23	32.57	1.04	2.80	1.45	0.15	0.42	9.66
G.GURNARD	8.17	7.56	2.08	2.67	4.49	3.79	0.44	12.65
LS DOGFISH	4.00	9.00	10.18	17.5	11.50	2.75	4.69	24.95
SPURDOG	12.00	9.50	13.50	6.82	-	1.89	7.10	8.11
SCAD	-	-	2.70	-	1.02	2.34	1.35	0.57
MACKERAL	4.95	0.51	8.61	-	9.32	0.50	2.36	17.88
ANGLERFISH	-	0.55	-		0.16	1.67	-	-
NEPHROPS	-	0.75	-	0.20	-	-	6.00	20.00
SQUID	-	0.13	17.10	-	2.09	11.00	0.02	0.24

STRATUM 7

SPECIES	STATION NUMBER 76	77	243	245	246
COD	0.80	7.07	59.50	9.08	36.15
WHITING	1.03	11.32	11.59	20.17	124.50
HAKE	-	-	6.89	4.76	2.66
HADDOCK	-	28.87	-	-	-
BIB	-	-	-	6.29	0.18
P.COD	6.85	40.00	10.31	23.52	-
N.POUT	0.02	0.01	0.02	0.02	-
HERRING	448.70	-	1.34	0.60	0.20
SPRAT	-	15.54	-	0.06	0.03
PLAICE	-	0.44	0.99	-	4.39
DAB	-	-	-	0.05	0.15
G.GURNARD	-	0.52	1.88	0.71	3.79
LS DOGFISH	25.30	4.11	27.00	-	2.75
SPURDOG	18.9	15.54	32.97	-	1.89
SCAD	-	1.50	0.48	0.39	2.34
MACKERAL	0.72	0.06	-	-	0.50
ANGLERFISH	-	-	16.00	13.00	1.67
NEPHROPS	-	0.28	-	-	-
SQUID	2.22	11.44	0.68	-	11.00