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DEPARTMENT OF AGRICULTURE [NI]
AQUATIC SCIENCES RESEARCH DIVISION

CRUISE REPORT: LF/23/92 : TECHNICAL CONSERVATION MEASURES

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

DATES: 5 - 14 October 1992

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

TYPE OF SURVEY: Gear Trial

PERSONNEL:

R. Briggs,	PSO	[SIC]
J. Peel,	ASO	
A. Hayes,	ASO	
S. Lapsley,	Student	
J. Robertson,	SOAFD	
P. Barkel,	SOAFD	
P. Carson,	Industry Representative (NIFPO)	

OBJECTIVES

1. To compare catch rates of a prawn trawl net fitted with a panel of square shaped mesh in its top sheet with one in which the top sheet has a panel of very large (150mm) diamond shaped mesh.

2. To examine the affect of longitudinal strengthening ropes on fish escapement from a prawn trawl fitted with a panel of square mesh.

3. To investigate fish escapement from a panel of square mesh of knotted twine compared to knotless twine fitted to a prawn trawl.

4. To collect population data on *Nephrops* and bycatch at each station.

5. To collect basic size composition and meat yield data of trawl caught brown crab (*Cancer pagurus*).

6. To collect samples of squid for future analysis at University College Cork.

METHODS

The gear used were two identical prawn trawl nets made by Jim Hamilton of Kilkeel (Figure 1). The the nets were fished with the following panel arrangements:

a. Knotless square mesh (nominal 75mm,mean 73mm) panel in extension with strengthening ropes.
b. Large diamond mesh (150mm) in front of extension.
c. Knotted diamond mesh panel (81mm) turned to make it square but without strengthening ropes. This panel was only part width of the sheet, having diamond mesh (80mm) strips (3 meshes wide) on each side joined into the selvedges.
d. Knotted diamond mesh as in 'c' but with 4 strengthening ropes.

Fish behaviour was studied using the SOAFD remote controlled television vehicle (RCTV). The RCTV was deployed over the ship's stern from the hydrographic winch by leading the winch wire through a pulley system to the 'A' frame. The behaviour of fish inside the net was studied by using a miniature video camera enclosed in a waterproof housing. Shorter than usual bridles (45m instead of 90m) were used for towing the net in order to reduce sediment stir that could impair net visibility by the two cameras.

Hauls were performed at stations selected from those visited during previous cruises (Figure 2). The areas fished during the recent ground-fish survey (LF2092), where young fish were found to occur (Strata 2 & 3), in particular.

All catches were sorted to species level using the multiple stage sampling procedures used in DANI ground-fish surveys. Catches were quantified and length frequencies recorded for all species captured. The size composition of male and female *Nephrops* were noted separately and the state of gonad maturity was assessed for females.

Crab catches were quantified and cooked meat yield assessed on selected samples. Squid specimens were frozen for later transportation to UCC.

NARRATIVE

Monday 5 October:
MRV Lough Foyle departed Belfast harbour at 10h.00 in calm weather conditions and proceeded to Ayr in Scotland, docking at 16h.30. Messrs. Robertson and Barkel boarded at 18.30 and work on assembling the SOAFD RCTV and ancillary equipment commenced while the vessel was in dock. Due to the tidal state of the Ayr berth *Lough Foyle* put to sea again at 22h.00 and steamed through the night to the Co. Down coast.

Tuesday 6 October: The fishing Master gave a comprehensive briefing to the scientific personnel on ship safety procedures which included a tour of the various exit points. Calm weather conditions allowed assembly of the SOAFD equipment to continue while the vessel was on station (Figure 2) for the first tow

which was shot at 14h.30, using the net with the large diamond panel along with the RCTV. This proved to be a successful first trial with all systems functioning well. The gear was hauled at 17h.45 and the vessel then proceeded to an anchorage in Carlingford Lough for the night.

Wednesday 7 October: Work commenced at 08h.15 with the same gear, at station 75 from the recent ground-fish survey(LF2092). Few escapes were observed through the large diamond mesh. Tow 3 was a repeat of the same station using the net with the a panel of knotless square mesh. Tow 4 was over station 93 from the ground-fish survey with the RCTV accompanied by a miniature video camera positioned inside the net under the square mesh panel. On completion of this tow the vessel dropped anchor for the night off Lambay Island.

Thursday 8 October: Tow 5 was shot at 08h.38 to the east of tow 4 and was a repeat of the same gear arrangement with the miniature camera positioned so as to view the panel of square mesh from inside the net. Tow 6 was in the region of station 91 from the September ground-fish survey. The vessel returned to anchorage off Lambay Island.

Friday 9 October: The anchor was lifted at 07h.15 and *Lough Foyle* proceeded north to an area north of tow 6 where large catches of juvenile whiting had occurred during the ground-fish survey. Although strong winds from the NE(25knots) prevented filming all day, two lengthy tows(7&8) with the square mesh panel net were completed before the ship made for a sheltered anchorage in Dundalk Bay for the night.

Saturday 10 October: A moderation in the weather allowed work to commence at 07h.00 when the anchor was hauled and the vessel proceeded to tow 9 in the region of station 78 from the ground-fish surveys. Both miniature camera and RCTV were used and excellent film of mass escapes by small fish from the net was made. The afternoon was spent working the large diamond panel net in the same area. The night was spent at anchor off Lambay Island.

Sunday 11 October: Two tows were performed (11 & 12) using the gear rigged as in tow 10. Good pictures from both the miniature camera and RCTV were obtained. Very few escapes through the large diamond mesh were observed. The ship returned to anchor off Lambay Island for the night.

Monday 12 October: The knotless mesh square panel was removed and replaced by knotted diamond shaped mesh, rotated so that the meshes assumed a square shape. A strip of 3 mesh wide braided diamond mesh was fitted to each side between the square mesh panel and the net selvedge. Both mini camera and RCTV were used to study fish escapement with this gear in tow 13 which was in a similar area to tow 12. Four longitudinal strengthening ropes were attached to this gear arrangement for tow 14 which was also in the same area as tow 12. On completion of tow 14 *MRV Lough Foyle* proceeded slowly through the night to Ayr.

Tuesday 13 October: MRV Lough Foyle docked into Ayr at 09h.30 where SOAFD personnel and their equipment disembarked. The vessel then returned to Belfast, docking at 21h.15.

RESULTS:

Fourteen successful hauls (Table 1) were performed, 7 with a knotless square shaped mesh panel, 5 with a large diamond mesh panel and 2 with a knotted square mesh panel made from turned diamond mesh (one tow with and one without strengthening ropes). All but two tows (7 & 8) were filmed with a total of 15 hours of U-matic video tape from the RCTV and 21 hours of VHS tape from the mini camera being used. Good quality video films of fish escapes from the square mesh panels and of fish behaviour inside the net prior to capture or escape were made. Although a few small fish escapes were seen at the edges of the large diamond mesh there were very few escapes through the mesh and much less overall escapes than through the square mesh panel. Apart from isolated individuals, no *Nephrops* were seen escaping from either net. Evidence from the miniature camera inside the net demonstrated clearly that *Nephrops* pass along the bottom of the net and seldom rise above the selvedges. Strengthening ropes did not appear to obstruct fish escapes through the square mesh panel or to distort the net in any way. By stopping the playback of the video tape to look at single frames during preliminary viewing, it was possible to use the square meshes of the panel for scale and assess the size of fish escaping. This method indicated that whiting escapes through the square mesh panels were confined to undersized (<27cm) fish. A more detailed account of fish behaviour in the net, by species, is given in Appendix 1.
Figure 3 shows the size range of whiting captured and Figure 4 gives the whiting catch rate for each tow. There was no sign of mesh distortion with the knotted mesh, though a longer trial would be required to investigate this aspect.

A detailed list of species caught is given in Appendix 2. Data from the analysis of *Nephrops* catches are shown in table 2 and will contribute to the data series on *Nephrops* variability being collected by ASRD. Brown crab (*Cancer pagurus*) was common in most tows and had a mean size of 151.1mm (range 111-196mm). The average cooked meat yield of these crabs was around 30%. It was noted that over 95% of crabs caught were females.

Data on catches during this cruise will, in addition to the investigation of technical conservation measures, contribute to the data on broad spatial coverage of species being obtained from DANI ground-fish surveys. These will provide important information for fish stock assessment and on the seasonal distribution of fish species, as well as giving an indication of regions where potentially high rates of discarding of young fish could be expected.

ACKNOWLEDGEMENTS

Sincere thanks are extended to Captain Gary Martin, Officers and Crew of the Lough Foyle for their co-operation throughout the cruise. The scientific staff are acknowledged for their high level of precision in the analysis of catch samples, many of which were very large. SOAFD are thanked for their collaboration in this study; especially Jack Robertson and Peter Barkel who were on the cruise. Fishing Industry observer Paul Carson, proved throughout the cruise to be far more than just an observer and made a valuable contribution to the cruises success.

Signed:

Scientist in charge..... date 13/10/92

Ship Master.....date 13/10/92

TABLE 1

DETAILS OF TRAWL STATIONS AND TOTAL CATCH

			Shooting			Hauling				
Date	Trawl Stn.	gear	time	lat.	long.	lat.	long.	mean* depth m	total dis tow nm	total catch kg
6 Oct	1	LD	14.30	53 55.1	5 47.9	53 47.5	5 50.8	49	8.2	151.9
7 Oct	2	LD	08.10	53 43.5	5 52.8	53 37.0	5 49.0	55	6.6	139.4
	3	SQ	12.45	53 40.6	5 51.1	53 35.7	5 49.0	58	4.9	290.2
	4	SQ	15.52	53 34.4	5 47.1	53 31.0	5 48.8	58	3.6	130.5
8 Oct	5	SQ	08.38	53 29.7	5 48.8	53 30.4	5 47.4	70	7.4	419.4
	6	SQ	13.27	53 31.9	5 45.1	53 33.1	5 51.2	64	8.5	252.4
9 Oct	7	SQ	08.40	53 31.9	5 49.6	53 40.4	5 50.6	60	8.7	181.5
	8	SQ	12.50	53 39.5	5 54.2	53 45.0	6 00.5	37	10.6	76.4
10 Oct	9	SQ	08.40	53 48.7	6 05.5	53 42.7	6 00.9	28	7.4	109.2
	10	LD	13.32	53 41.9	5 29.3	53 43.9	6 01.5	28	10.0	208.2
11 Oct	11	LD	08.40	53 34.7	5 53.7	53 41.7	5 51.7	42	7.1	287.5
	12	LD	13.35	53 41.7	5 52.2	53 32.9	5 51.7	49	8.2	293.2
12 Oct	13	KSQNR	09.00	53 31.7	5 50.6	53 33.5	5 51.5	55	6.6	283.8
	14	KSQ	12.00	53 31.3	5 50.6	53 36.6	5 53.1	52	5.6	276.7

* mean of shooting and hauling depth

SQ: knotless square mesh panel + 2 longitudinal ropes
LD: Large (150mm) diamond mesh panel
KSQNR: knotted square mesh without longitudinal ropes
KSQ: knotted square mesh panel with 4 longitudinal ropes

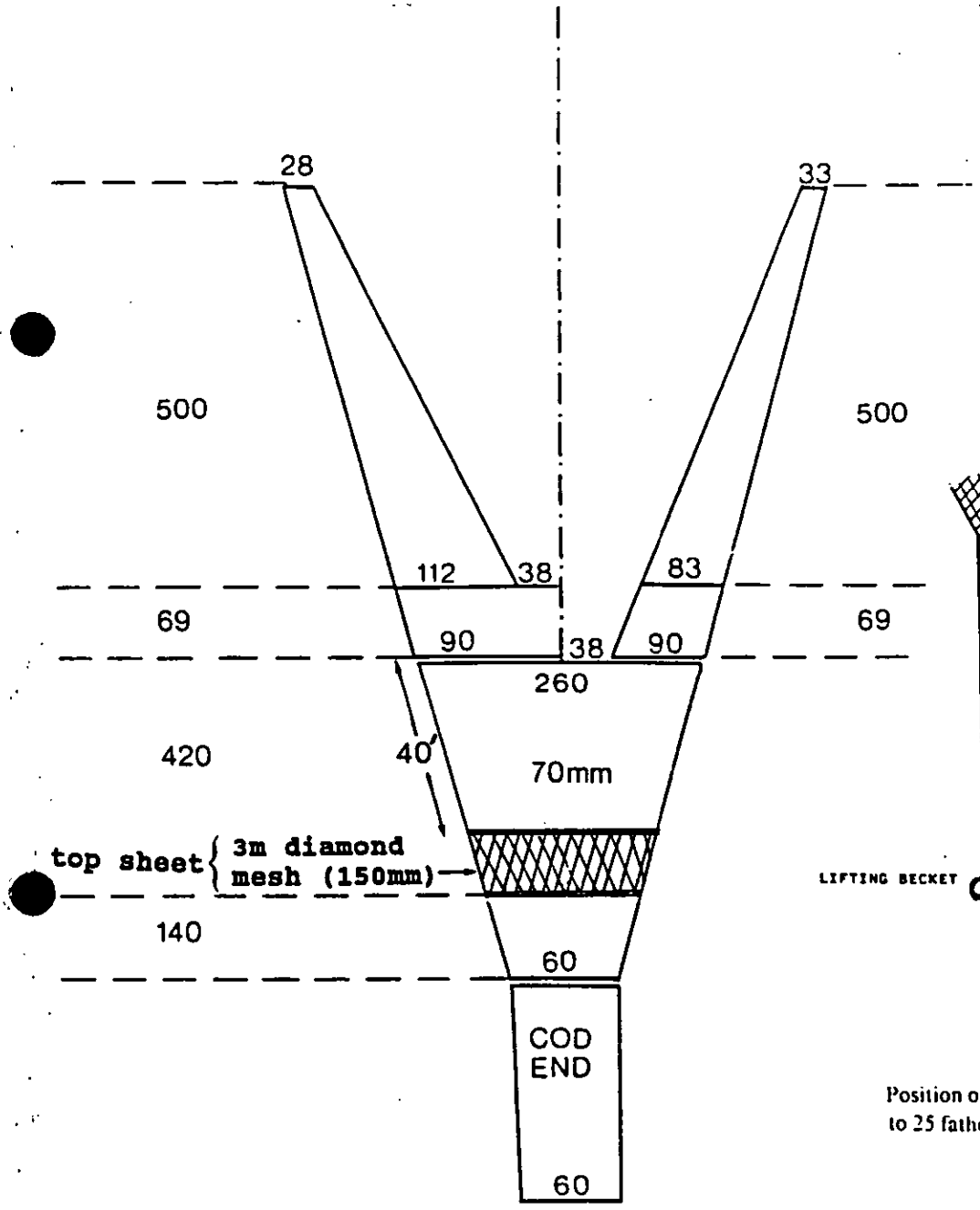
TABLE 2

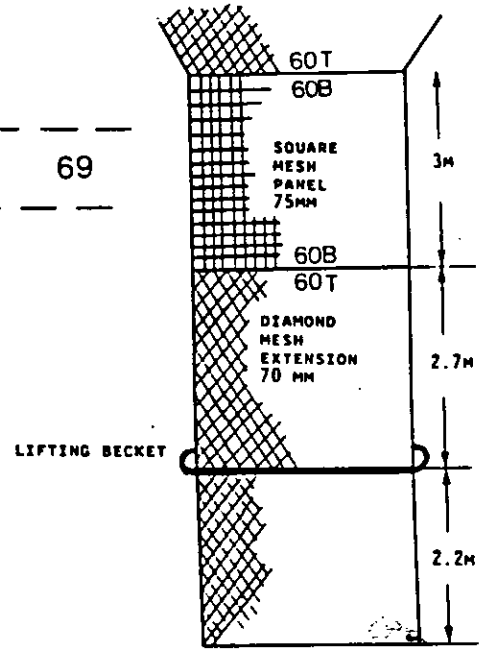
MEAN CARAPACE LENGTH AND SEX RATIO OF *NEPHROPS*

TOW	MALES mm CL	FEMALES mm CL	PERCENT FEMALE	*NEPHROPS* CATCH kg/nm
1	24.5	20.5	39.2	2.2
2	24.1	21.2	39.4	17.9
3	25.3	21.8	38.3	28.2
4	26.0	21.9	34.2	13.1
5	26.4	23.0	26.0	5.8
6	26.4	23.9	30.8	4.8
7	27.2	23.0	20.4	1.4
8	too few to measure			0.3
9	none			
10	too few to measure			0.1
11	25.3	21.8	31.6	15.6
12	26.4	22.5	37.1	7.8
13	27.2	24.8	21.1	2.6
14	27.1	25.2	22.6	2.0

Figure 1

Net plan of nets used during cruise with details of positioning of the large diamond mesh and the square mesh panel





Position of square shaped mesh panel fitted to 25 fathom *Nephrops* trawl.

Figure 2

Map showing position of trawl stations

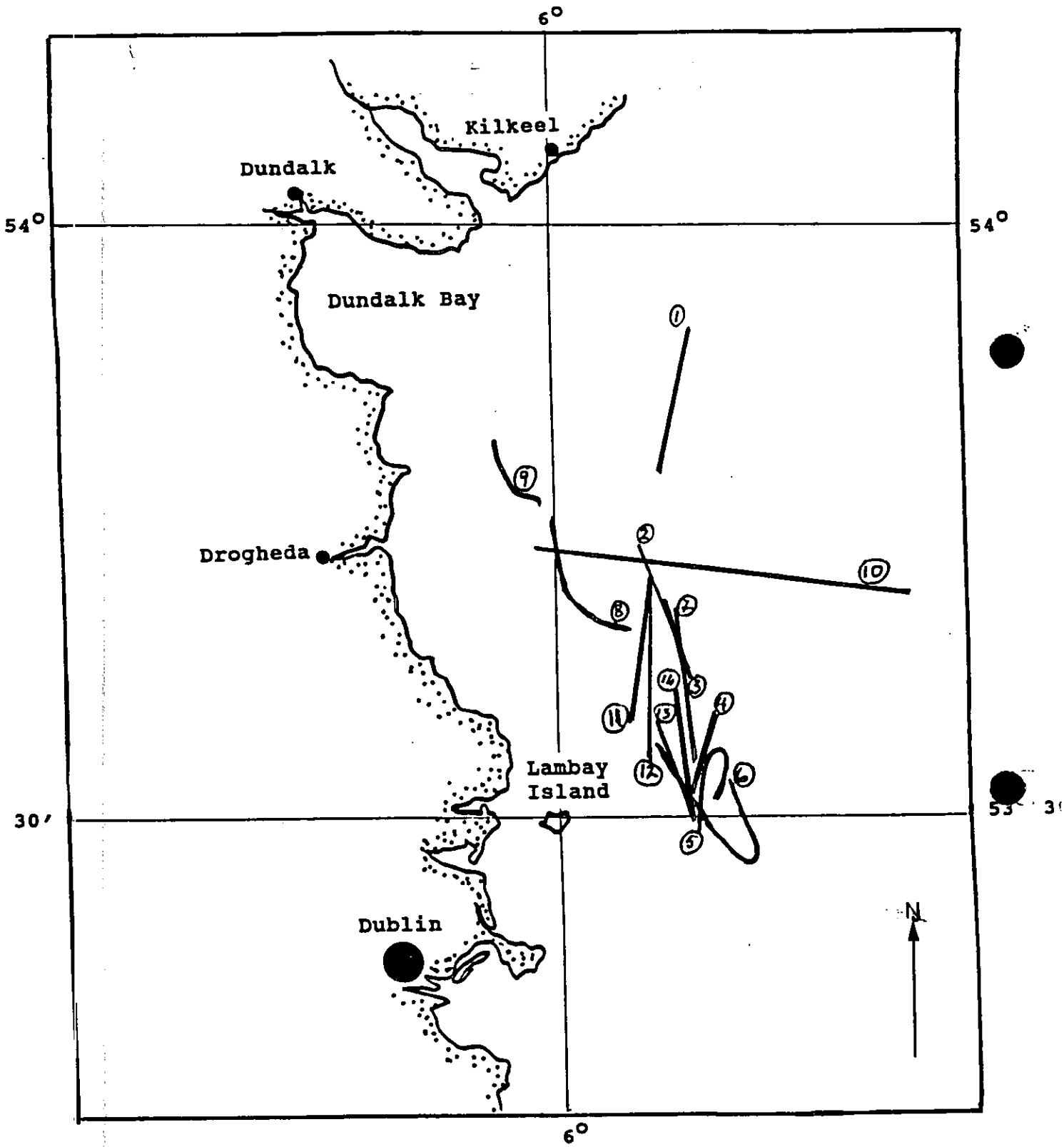
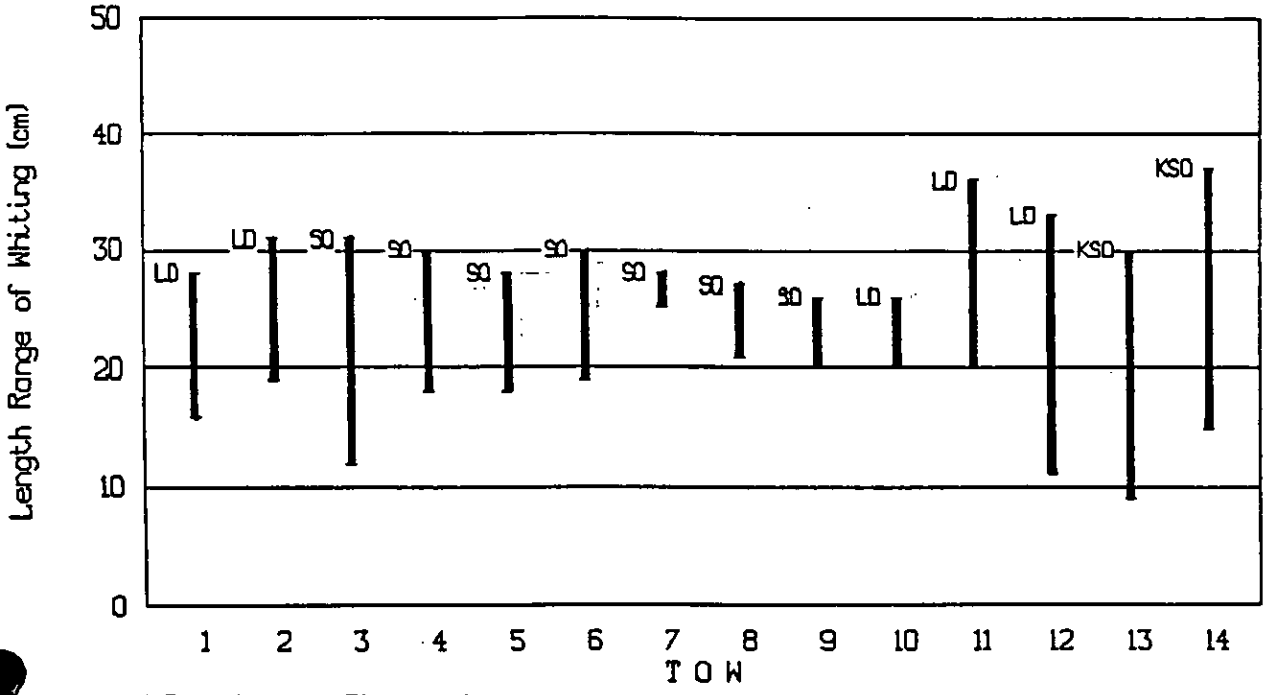
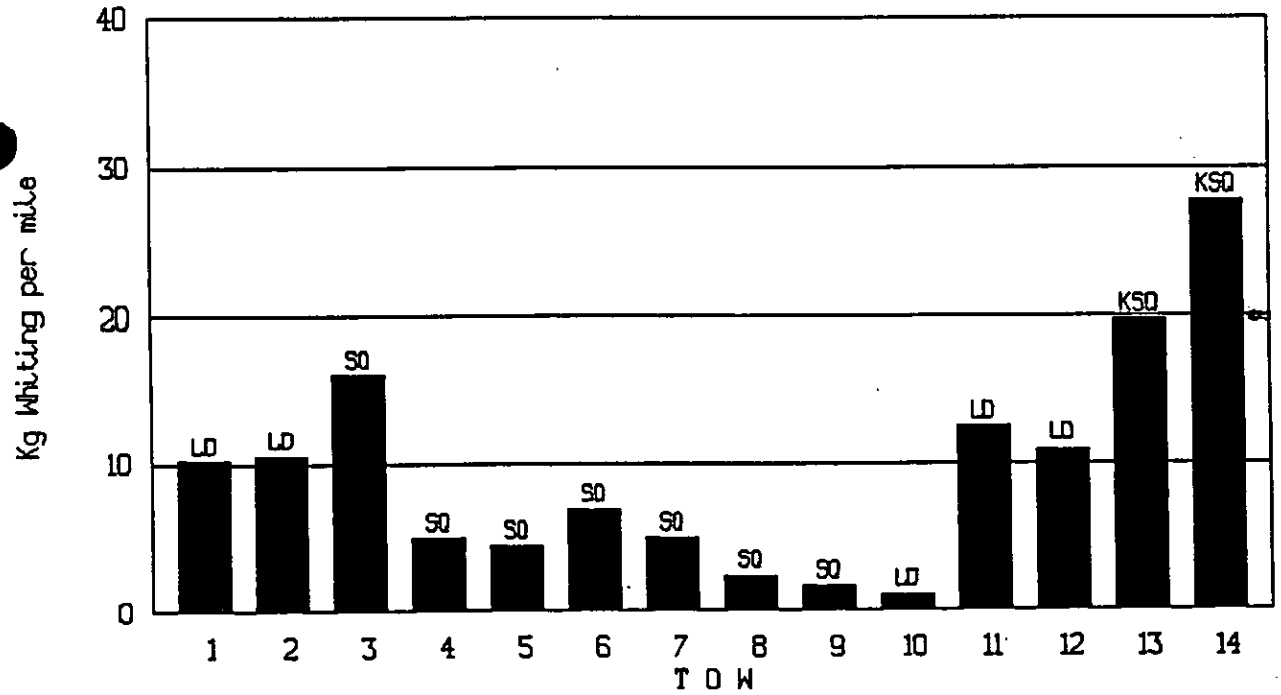


Figure 3
Whiting Length Range



LD - Large Diamond
SQ - Knotless Square
KSQ - Knotted square

Figure 4
Whiting Catch Rate by Tow



LD - Large Diamond
SQ - Knotless Square
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APPENDIX 1

FISH BEHAVIOUR PATTERNS FROM UNDERWATER OBSERVATIONS ON A TRAWL
(notes made during cruise from preliminary viewing of tapes)

Two filming methods obtained Low Band U-Matic video tape filmed with the RCTV flying alongside and outside the trawl and by VHS video tape with a Miniature Camera (Osprey) fitted inside the trawl and wired to a remote recorder and power device attached elsewhere on the trawl. Throughout this description the two types of film will be called "RCTV" and "Mini TV".

WHITING (*Merlangius merlangus)*
Whiting can be termed a positive swimmer in that 1)it swims strongly within the trawl extension and codend 2)it has quite distinct body orientations at the various stages of capture 3)it apparently makes repeated attempts to escape from the gear especially when confronted with the narrow confines of the extension and codend. The overriding and most outstanding behaviour characteristic is that it tends to swim upwards when making escape attempts. The fish almost always escapes from the top part of the net and can be observed pointing upwards at an angle as it drops back along the extension or codend. The nose-up attitude can vary between 5 to 90 degrees. Mostly the fish is facing forward as it is overtaken by the trawl. In passive mode the fish will be slightly nose-up but if escape attempts are being made the fish will dart at the netting at any angle. The more vigorous the attempt the greater the angle. This behaviour pattern is utilised by placing an escape panel in a narrow part of the extension or codend so that more open meshes are as near to the fish as possible. Thus, the upwards seeking whiting will be able to penetrate through the open mesh to freedom. The MINI TV pictures from haul 5 are particularly good to illustrate upwards behaviour and when linked with the external simultaneous video from the RCTV show forceful and vigorous body movements through the mesh.See TAPE 3 HAUL 2 for excellent escapes from the codend. See also TAPE 7 AND 8 HAUL 9 FOR EXCELLENT ESCAPES (ie; 4850 to 6100 TAPE 7 and 531 to 1120 TAPE 8). See MINI TV tapes from HAULS 11 and 12 for unique observations of whiting oriented at right angles to the direction of tow - stationary to the netting they seem to let the net pass for some time before 1) darting away (usually up) or 2) taking up the same orientation or 3) facing towards the codend or 4) facing forwards.

SCAD (*Trachurus trachurus)*
Like many pelagic species this fish is extremely lively and is capable of swimming into, then out of a trawl. Endurance inside the net is phenomenal and Hauls 4, 5, 6 are good illustrations of how the scad can stay swimming at one position in the net for long periods and then with apparent ease can swim steadily or by spurts forward for large distances along the extension. They push almost violently against the meshes, either from a standing position or by driving hard against the netting with a short burst of speed. As a consequence they can become enmeshed. This happened most graphically in haul 4 and 5 when one or two fish were meshed in the square mesh window meshes at the forward end. However, on hauling tow 4 some 27 scad were meshed over the whole length of the square mesh panel. This could only have happened on hauling when the vessel is slowed to haul the net allowing the lively scad from behind the panel to swim forward until encountering the open meshes, pushing through but getting caught.

Again some 7 scad were meshed at the rear of the panel on hauling tow 5 which had not been there whilst towing. Interestingly, with the square mesh panels of hauls 13 and 14 with their larger mesh size ie; 80mm on the ICES gauge, 7 scad became meshed during tow 13 and 4 scad during tow 14.

PRAWNS *(Nephrops norvegicus)*
Prawns are almost entirely passive (although see next paragraph) when passing below the window. They tumble and trundle and spin out of control along the lower panel and never seem to drift higher than the selvedges on either side (although very occasionally the odd one is seen to pop through the meshes of the window (eg; square mesh TAPE 4 HAUL 5, 6005 and large diamond mesh TAPE 2 HAUL 2 3358). The square mesh window designs used on hauls 13 and 14 had strips of diamond mesh against the selvedge which effectively stopped any prawns being washed out of the panel whilst towing (eg; see RCTV tapes 14 and 15 and the MINI TV tapes for each haul). Occasionally the odd one may grasp onto eg; a meshed fish or fish/crustacean lying on the lower panel with its pincers, but apparently cannot hang on for long (see TAPE 5 HAUL 5 RCTV 2050 for unique prawn hanging on). The meshes in the diamond mesh lower panel are never open enough for the animals to penetrate and escape eg; see MINI TV film from Haul 5. Sometimes, they tail-flick and can momentarily keep station with the net but this reaction is always brief and the effect on position within the net is negligible ie; they are rarely able to move forward except very small distances (they are probably too exhausted or possibly disoriented, unlike in front of the footrope where previous observations have demonstrated that they can tail-flick for moderate distances (ie; 5 to 10m at 2 to 2.5knots).

COD (*Gadus morhua*)
As in most other observations, cod are rather lugubrious in that they do not apparently make many attempts to escape. They drift slowly back along the extension and seem to be calm compared to the other species around them (such as scad, whiting, haddock) which may be making repeated attempts to escape. They do sometimes "nose" the netting but it is a soft and gentle motion rather than the hard pressing of the scad, for example. Nosing generally only takes place when other species around are frantically pushing or in some cases battering against the netting (eg; see RCTV tapes 14 and particularly 15). The nosing is associated with a general tendency to tilt the body, head-up by approximately 5 to 10 degrees from the horizontal. They seem to be able to keep station in the net at one point for long periods without apparently becoming exhausted (eg; see TAPE 6 HAUL 6, 1700) and this may often be associated with the use of, usually, one pectoral fin to hang onto the netting (ie; see RCTV tapes 14 and 15 and MINI TV).

BROWN CRAB (*Cancer pagurus*)
One crab seen walking forward along lower sheet and a few seen trundling back along lower sheet (search for sections). See also all of the MINI TV tapes.

SWIMMING CRAB (*Macropipus depurator*)
Unique shot of small crab grasping a square mesh and hanging on outside the window at TAPE 6 HAUL 6 1640.

DOVER SOLE (*Solea solea*)
Generally flatfish swim or drift back, head facing forwards. A lot are also observed to swim or drift back head facing aft. However, some flats can swim in the extension and keep pace with the net for short periods. A dover sole was observed to keep station with the net (TAPE 4 haul 5 4420 RCTV and on the MINI TV).

JOHN DORY (*Zeus faber*)
Not previously observed in the extension. The RCTV TAPE 2 HAUL 2 4310 shows one battering against the netting momentarily.

HERRING (*Clupea harengus*)
Some good escape observations were made from the large diamond mesh (ie TAPE 2 HAUL 2 5700 and the square mesh window TAPE 3 HAUL 4 2730,2810,3015,3242,3257,3630,3725,3858,4600,5227). Generally escape behaviour is vigorous. These were small herring requiring many tail beats as they attempted to keep station with the net but could not and were gradually overtaken. Swift and many dashes at the netting were made along the extension with many escape attempt failures through the closed diamond meshes but first attempts through the more open large diamond and square mesh windows were successful. More seemed to escape through the square meshes.

MONKFISH (*Lophius piscatorius*)
Monks tend to flash past the camera observation area either head first towards the codend or facing forwards. But there are times when they press down on the lower sheet and by sheer body friction and hydrodynamic press-down stay immobile for long periods (ie; see MINI TV from haul 14).

GREY GURNARD (*Eutrigla gurnardus*)
Gurnards tend to favour the lower sheet where they may press down and often use both pectoral fins to steady themselves and one pectoral to hang on to a mesh or block in front of an obstruction (ie; see RCTV tapes 14 and 15 and MINI TV haul 14). Cod also use their pectorals to hang onto the netting.

NOTE:
Other species such as plaice, witch, haddock were also observed but are not reported here due to lack of video play-back time. These further observations will be included in a fuller version later.

APPENDIX 2

Qua ies of Each Species Caught by Tow (Kg)

(LD = large diamond S = square KS = knotted square)

TOW 1 dist	(LD) 8.2nm	TOW 2 dist	(LD) 6.6nm	TOW 3 dist	(S) 4.9nm	TOW 4 dist	(S) 3.6nm	TOW 5 dist	(S) 7.4nm	TOW 6 dist	TOW 7 dist	(S) 8.7nm
WHITING	82.68	NEPHROPS	87.00	NEPHROPS	100.50	NEPHROPS	46.50	HADDOCK	282.50	SCAD	SCAD	91.00
NEPHROPS	18.00	WHG	69.00	SCAD	96.00	LS.DOG	22.50	NEPHROPS	43.00	WHITING	WHITING	42.00
LSD	15.50	SCAD	26.00	WHITING	76.20	HAD	21.62	WHITING	32.03	HADDOCK	ANGLER	17.67
SCAD	7.95	SQUID	9.76	CRAB	5.38	WHITING	17.30	COD	13.51	NEPHROPS	NEPHROPS	12.00
CONGER	2.71	MACK	6.13	ELEDONE	3.21	SCAD	7.40	SCAD	13.00	COD	HADDOCK	5.41
SQUID	2.57	ELEDONE	1.88	SQUID	1.78	WITCH	4.28	LS.DOGS	11.00	D.SOLE	COD	4.05
MONK	2.49	COD	1.78	WITCH	1.74	D.SOLE	3.07	CANCER	5.18	CANCER	CANCER	1.87
HERR	1.73	WITCH	1.47	MAC	1.45	ELEDONE	2.31	MONK	4.67	LRD	SQUID	1.62
MAC	1.43	J.DORY	1.32	COD	.66	CRAB	1.38	WITCH	3.39	SQUID	D.SOLE	1.19
WITCH	.74	CANCER	1.32	G.GURN	.59	SQUID	1.35	D.SOLE	3.29	LS.DOG-	G.GURNARD	.93
CANCER	.64	HERR	.92	LRD	.57	LRD	.65	MIX CRB	1.55	CONGE	LR.DAB	.92
HAKE	.52	MONK	.89	HERR	.56	G.GURN	.53	PLAICE	1.51	PLAICE	MACK	.75
LRD	.48	LRD	.78	PLAICE	.30	HAKE	.46	POGGE	1.16	DAB	WITCH	.46
DAB	.40	G.GURN	.68	DAB	.28	Q.SCAL	.42	Q.SCAL	.76	G.GURN	MIXED CRA	.38
ELEDONE	.39	HAKE	.41	HAKE	.28	P.COD	.33	SQUID	.73	MONK	HAKE	.33
GUG	.30	HADD	.31	J.DORY	.25	L.SOLE	.19	G.GURNARD	.62	POGGE	PLAICE	.27
N.POUT	.23	DAB	.22	MONK	.10	POGGE	.16	LRD	.39	MACK	DAB	.25
R.GURN	.20	LS.DOG	.15	NEPHROPS	.10	N.POUT	.06	P.COD	.35	ELEDONE	J.DORY	.23
J.DOR	.17	N.POUT	.13	POGGE	.10			ELEDONE	.32	J.DORY	ELEDONE	.15
BIB	.14	P.COD	.08	Q.SCAL	.08			N.POUT	.12	P.COD	Q.SCALLOP	.05
CDT	.06	POGGE	.02	TB-SOLE	.04			HERRING	.11	LING		
SPRAT	.03	4B-ROCK	.02	P.COD	.04			BIB	.09	DRAGON		
P.COD	.01			4B-ROCK	.01			DAB	.09	N.POUT		
				SEPIOLA	.01			H.RAY	.08	Q.SCAL		
				S.BLEN	.01					HERRING		
				CDT	.01					WITCH		
				SPRAT	.01					BIB		
										SPRAT		
TOT[redacted]	151.91	TOTAL	139.38	TOTAL	290.24	TOTAL	130.49	TOTAL	419.44	TOTAL	TOTAL	181.52

TOW 8 dist	(S) 10.6nm	TOW 9 dist	(S) 7.4nm	TOW 10 dist	(LD) 10nm	TOW 11 dist	(LD) 7.1nm	TOW 12 dist	(LD) 8.2nm	TOW 13 dist	(KS) 6.6nm	TOW 14 dist	(KS) 5.6nm
WHITING	25.03	LS.DOGS	42.50	PLAICE	58.00	NEPHROPS	110.50	WHITING	89.47	WHITING	130.57	WHITING	155.56
PLAICE	22.00	PLAICE	28.00	DABS	52.00	WHITING	88.08	SCAD	78.50	HADDOCK	33.00	HADDOCK	26.01
DAB	11.38	WHITING	12.85	LS.DOGS	36.09	SCAD	27.22	NEPHROPS	64.00	SQUID	22.00	ANGLER	16.44
CANCER	4.68	DABS	12.07	POGGE	18.00	SQUID	11.40	CANCER	20.47	NEPHROPS	17.00	SCAD	16.00
SQUID	4.30	CANCER	3.68	WHITNG	10.47	CANCER	9.44	SQUID	12.50	CANCER	13.46	NEPHROPS	11.00
MONK	1.81	WITCH	1.94	CANCER	9.50	PLAICE	7.04	LR.DAB	3.48	SCAD	12.76	SQUID	9.96
WITCH	1.57	DRAG	1.26	ANGLER	3.92	DAB	5.71	WITCH	3.48	COD	11.33	COD	7.97
G.GURN	1.29	ANGLER	1.15	MAC	2.82	COD	5.51	COD	3.44	GR GURN	8.62	SW.CRAB	4.77
COD	.95	TURBOT	1.12	WITCH	2.58	WITCH	3.55	G.GURN	3.21	PLAICE	6.52	CANCER	4.41
J.DORY	.61	D.SOLE	1.03	SQUID	2.40	G.GURN	3.27	MACK	2.90	ANGLER	5.94	G.GURN	4.12
HAKE	.60	G.GURN	.96	G.GURN	2.37	LRD	2.62	ANGLER	2.39	LR.DAB	2.82	LR.DAB	3.39
SCAD	.46	THB.RAY	.76	HAKE	2.29	ELEDONE	2.13	DAB	2.12	WITCH	2.71	LS.DOG	3.22
D[redacted]	.43	MACK	.47	SW.CRABS	1.53	ANGLER	2.01	HAKE	1.69	SW.CRAB	2.47	WITCH	2.08
DR[redacted]	.29	SQUID	.46	D.SOLE	1.40	HERRING	1.65	ELEDONE	1.64	DAB	2.19	MACK	2.04
MACK	.27	J.DORY	.25	DRAG	1.26	J.DORY	1.56	PLAICE	.87	MACK	2.10	HERRING	1.91
NEPHROPS	.26	S.CRAB	.24	LRD	1.01	D.SOLE	1.40	J.DORY	.67	D.SOLE	1.94	DAB	1.54
LRD	.20	NEPHROPS	.17	COD	.80	MACKEREL	1.18	T.GURN	.65	LS.DOG	1.71	D.SOLE	1.44
ELEDONE	.12	LRD	.17	CYPRINA	.46	HAKE	1.16	N.POUT	.42	HAKE	1.17	ELEDONE	1.17
R.GURN	.11	HERRING	.17	L.SOLE	.32	HADDOCK	.08	LS.DOGS	.31	N.POUT	1.04	PLAICE	.97
LS.DOG	.02			J.DORY	.30	LMPSUCK	.65	HERRING	.25	J.DORY	.92	HAKE	.67
				TURBOT	.20	POGGE	.57	D.SOLE	.24	TUB GURN	.84	J.DORY	.45
				SCAD	.20	N.POUT	.45	POGGE	.22	POGGE	.64	N.POUT	.44
				HERRING	.17	DRAG	.13	Q.SCAL	.11	ELEDONE	.63	DRAG	.26
				NEPHROPS	.13	Q.SCAL	.11	SW.CRAB	.10	P.COD	.49	Q.SCAL	.24
				SPRAT	.00	P.COD	.08	P.COD	.05	DRAG	.37	P.COD	.22
								SEPIOLA	.01	HERRING	.34	POGGE	.20
										Q.SCAL	.10		
										HOM.RAY	.08		
TOTAL	76.37	TOTAL	109.25	TOTAL	208.20	TOTAL	287.50	TOTAL	293.16	TOTAL	283.77	TOTAL	276.45