**DEPARTMENT OF AGRICULTURE [NI]**
**AGRICULTURAL AND ENVIRONMENTAL SCIENCE DIVISION**
**(Aquatic Systems Group)**

# CRUISE REPORT - LF3498

## *NEPHROPS* AND ASSOCIATED FAUNA 17-27 August 1998

### PERSONNEL

Richard Briggs, *PSO (Scentist in Charge)*
Matt Service, *SSO (17-21)*
Willie McCurdy, *SSO (22-24)*
Michael McAliskey, *SO (22-27)*
John Peel, *ASO*
Ronnie Snyder, *QUB (22-27)*
Nuala McQuaid, *QUB*
Sharon Thompson, *Marine Institute (17-21)*
Jennifer Whitmore, *Marine Institute (17-21)*

### OBJECTIVES

- To film the seabed at the established stations sampled during previous cruises.
- To take beam trawl samples of epifauna at each station.
- To continue a RoxAnn survey of the western Irish Sea initiated in 1997
- To collect data on spatial patterns of *Nephrops* and bycatch abundance
- To collect *Nephrops* for *in vitro* studies at C-mar/QUB, Portaferry.
- To assess the prevalence of the dinoflagellate parasite *Hematodinium* in *Nephrops* catches.
- To Collect data and samples of sprat and herring for a population / feeding study.
- To retain live specimens of selected cephalopod species and the crab *Gonoplax rhomboides* for 'Exploris' in Portaferry.

### METHODS

Camera tows of 20-30 minute duration followed by beam trawl sampling of the benthic and epibenthic fauna were completed at each station (Figure 1). The technique for beam trawling developed in 1997 (LF34/97), with 5 minute tows at around 2 knots speed gave the best results. The 2 metre beam trawl was fitted with a fine mesh (10mm) codend and very fine (5mm) liner. The catch was passed through a 2mm sieve and the retained fauna identified and quantified.

Hauls of 60 minutes duration were completed at each station during the second week of the cruise using the DANI *Nephrops* trawl. This gear was the same as was used in earlier cruises and is a custom made 20 fathom *Nephrops* net of nominal mesh size 50mm throughout. Catch bulk was quantified by counting baskets filled from the catch. Sample baskets of catch were sorted to provide an assessment of species composition. The *Nephrops* in each sub-sample

were divided into male and female components and the ovary maturity stage of female animals noted. Carapace length frequency distributions of both male and female *Nephrops* were measured and the number of recently moulted (soft shelled) animals counted. Whole animals were examined for the prevalence of the parasitic dinoflagellate *Hematodinium*. The contribution of finfish in catches was quantified and their length compositions measured. Stratified sampling procedures were similar to those used during DANI groundfish surveys. *Nephrops* from selected stations were retained alive in a large tank for future studies at the C-mar laboratory in Potaferry.

*Sunday 16 August:*
Scientific staff boarded during the evening and a safety meeting was convened by the Chief Officer. The vessel sailed at 23h.00 and steamed towards the Northern part of the western Irish Sea *Nephrops* grounds.

*Monday 17 August:*
*RV Lough Foyle* steamed to station 2 (Figure 1) where the sledge and underwater video were deployed. After 20 minutes filming the sledge was recovered and the beam trawl deployed in the same area and towed for 5 minutes. This exercise was repeated at stations 1,35,17, 30 and 207. The night was spent performing an east/west RoxAnn survey grid.

*Tuesday 18 August:*
Camera and beam trawl tows were completed at stations 208, 209, 109, 20, 10, 101 and at a new station (15) situated under the eye of the Irish Sea gyre. Earlier sediment analysis demonstrated this station to be in an area of especially fine sediment structure. The day was completed by repeating the beam trawl procedure at station 10 during darkness (21.50), in order that catches during light and dark regimes could be compared. The night was spent continuing the RoxAnn survey initiated the previous night.

*Wednesday 19 August:*
The camera and beam trawl procedure was repeated at stations 108, 102, 7, 8, 107 and 201. A good catch of "0" group *Nephrops* was made at station 103. The area of the DANI oceanographic mooring was inspected and the main installation was found to have moved and some components were missing. This information, along with details of the new position, were reported to AESD. The RoxAnn survey was continued through the night.

*Thursday 20 August :*
Work commenced at 08.06 at station 104 with a beam trawl and camera tow. Two beam trawl hauls were made in the vicinity of station 106 (106a & 106b) in order to cover areas surveyed during Marine Institute cruises as part of the EU funded project on *Nephrops* growth (DGXIV/95/086). This was followed by camera and beam trawl tows at stations 105 and 200. Due to a deterioration in the weather the vessel moved to a new and more sheltered station near the Irish Coast (212) where the evening was spent performing alternate camera and beam trawl tows to study the effect of daylight on *Nephrops* emergence. The night was spent at anchor off Skerries.

*Friday 21 August:*
As the planned objectives for the first half of the cruise had been achieved the trawl gear was prepared and the net shot at station 105. The vessel then set course for Dublin, docking at 14.00 for a mid cruise break where Dr Service, Dr Thompson and Ms Whitmore disembarked. Messrs. McCurdy, McAliskey and Snyder joined the ship on Friday evening.

*Saturday 22 August*:
The day was spent in Dublin.

*Sunday 23 August*:
*RV Lough Foyle* sailed at 10.30 and fishing operations resumed at station 200. This was followed by stations 106 and 104. Difficulties were experienced in hauling the catch at these stations due to a faulty marine crane. Arrangements were made for an engineer to board the ship on Monday to repair the crane. The night was spent at anchor in Dundrum Bay.

*Monday 24 August:*
After fishing station 30 *R.V. Lough Foyle* proceeded to a rendezvous off Annalong with engineers who repaired the damaged crane. Mr McCurdy, who had been suffering from a painful knee, disembarked with the engineers. Work commenced again at 16.00 at station 207, followed by stations 8 and 107. The night was spent drifting in the vicinity of station 103.

*Tuesday 25 August:*
The net was shot at station 103 at 07.35 followed by stations 102, 7, 108, 10 and 20. The night was spent drifting on station in calm weather conditions.

*Wednesday 26 August:*
Fine weather enabled stations 15, 17, 35, 109, 209 and 208 to be fished. The night was spent drifting in the region of stations 1 and 2.

*Thursday 27 August :*
Stations 2 and 1 were fished and *RV Lough Foyle* set course for Belfast, docking at 14.30

**RESULTS**
During the first week of the cruise 25 camera and beam trawl stations were sampled (Fig. 1 & Appendix 1). Video films were of the highest quality yet to be obtained for the Irish Sea *Nephrops* grounds. Tapes will be archived for future analysis of burrow density which will provide a fishery independent assessment of *Nephrops* biomass. The beam trawl survey provided valuable data on the fauna living on and in the bottom sediment. Over 100 taxa have now been observed using this technique and the data obtained will be further analysed along with the RoxAnn data in order to further our understanding of the *Nephrops* habitat.. The beam trawl was especially useful for sampling juvenile ("0" group) *Nephrops*. A particularly fruitful haul was at station 103 where over 90 juveniles were captured (Figure 2). These gave a mean carapace length of 8.7mm and will provide valuable input to the ongoing study of *Nephrops* growth through polymodal analysis. An experiment on the effect of daylight on *Nephrops* emergence demonstrated an increased *Nephrops* abundance in beam trawl catches during dusk. The experiment was performed at station 212 and the results are summarised in the text table below.

| Time | Number of *Nephrops* |
|---|---|
| 18.32 | 0 |
| 19.30 | 0 |
| 20.16 | 21 |
| 21.00 | 4 |

During the fishing phase of the cruise 22 stations were sampled as indicated in Fig.3 & Appendix 1. Table 1 is the mean size, catch rate, proportion of female *Nephrops* in catches. About 200 live *Nephrops* were retained for *in vitro* studies to be performed at Cmar, Portaferry. No occurrences of *Hematodinium* infection were observed during the cruise.

The predominant by-catch species was whiting (*Merlangius merlangus)* and Figure 4 is the pooled whiting size composition expressed as catch at length per nautical mile. Figure 5 is similar data for haddock. Table 2 shows the proportion of *Nephrops*, cod, whiting, hake, haddock, brown crab and other fish caught at each station.

Live specimens of selected cephalopod species and the crab *Gonoplax rhomboides* were collected and retained in an aquarium system aboard the ship. These were transported to 'Exploris' in Portaferry after docking. Specimens of herring and sprat were frozen for future investigations.
In addition to contributing to the DANI time series data base on *Nephrops,* information from this cruise will contribute to an EU funded project on the age and growth of *Nephrops* in western waters (DGXIV: 95/086).

**ACKNOWLEDGEMENTS**
Captain Niblock, Officers and Crew of *RV Lough Foyle* are thanked for their enthusiastic co-operation throughout the cruise. The scientific personnel are congratulated on their dedication to duty and their valuable contribution to the success of the investigations performed.

Richrd Briggs (Scientist in Charge)
27 August 1998

Andrew Niblock (Master)
(Report seen in draft)

Table 1

Mean size, catch rate and proportion of female *Nephrops* in trawled catches

| TOW | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STATION | 105 | 200 | 106 | 104 | 207 | 30 | 8 | 107 | 103 | 102 | 7 |
| MALE CL | 25.5 | 30.3 | 26.4 | 27.3 | 26.8 | 27.5 | 24.9 | 27.3 | 29.9 | 28.2 | 28.3 |
| FEMALE CL | 25.3 | 28.8 | 22.8 | 24.7 | 23.7 | 25.0 | 21.8 | 23.7 | 25.7 | 23.7 | 26.0 |
| No per Nm | 97 | 889 | 2640 | 1706 | 5515 | 330 | 8109 | 2013 | 1521 | 282 | 94 |
| kg per Nm | 1.3 | 19.7 | 33.7 | 24.0 | 69.9 | 4.5 | 78.7 | 25.3 | 26.7 | 4.0 | 1.2 |
| % female | 42.6 | 35.6 | 34.5 | 40.4 | 44.0 | 42.8 | 47.2 | 36.9 | 26.6 | 31.7 | 39.7 |

| TOW | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| STATION | 108 | 10 | 20 | 15 | 17 | 35 | 109 | 209 | 208 | 2 | 1 |
| MALE CL | 28.2 | 27.8 | 27.0 | 23.8 | 24.5 | 24.6 | 23.9 | 27.7 | 26.0 | 23.0 | 22.7 |
| FEMALE CL | 26.0 | 24.5 | 24.7 | 21.9 | 23.1 | 22.4 | 22.3 | 23.4 | 23.2 | 22.0 | 20.4 |
| No per Nm | 9214 | 810 | 1902 | 13898 | 4965 | 3353 | 4379 | 336 | 10577 | 14631 | 13557 |
| kg per Nm | 135.6 | 10.7 | 24.2 | 124.0 | 48.0 | 30.7 | 37.9 | 4.1 | 123.5 | 124.9 | 96.4 |
| % female | 48.7 | 37.8 | 39.1 | 51.4 | 54.6 | 50.0 | 50.7 | 47.0 | 56.7 | 48.8 | 51.5 |

Table 2

Catch (kg) per nautical mile of tow (LF3498)

| TOW | STN | *Nep* | Cod | Whi | Hake | Had | Herr | Spr | O.Fish |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 105 | 1.31 | 0.00 | 10.91 | 0.00 | 0.00 | 0.00 | 0.00 | 21.61 |
| 2 | 200 | 19.75 | 0.09 | 66.55 | 0.70 | 65.41 | 37.43 | 0.15 | 63.53 |
| 3 | 106 | 33.66 | 0.00 | 8.08 | 0.13 | 4.13 | 0.00 | 0.00 | 3.29 |
| 4 | 104 | 23.97 | 0.00 | 5.61 | 0.00 | 0.17 | 0.08 | 0.00 | 3.89 |
| 5 | 30 | 74.56 | 0.00 | 57.96 | 0.96 | 8.80 | 0.00 | 0.00 | 57.14 |
| 6 | 207 | 4.18 | 0.38 | 35.29 | 0.61 | 13.13 | 0.00 | 0.03 | 9.10 |
| 7 | 8 | 78.57 | 0.18 | 4.53 | 0.41 | 0.05 | 0.12 | 0.00 | 1.38 |
| 8 | 107 | 25.30 | 0.00 | 15.52 | 0.08 | 0.12 | 0.04 | 0.00 | 2.09 |
| 9 | 103 | 27.19 | 4.72 | 17.82 | 0.22 | 1.23 | 0.00 | 0.00 | 6.81 |
| 10 | 102 | 3.99 | 2.46 | 9.27 | 0.11 | 0.07 | 0.00 | 0.00 | 10.73 |
| 11 | 7 | 1.24 | 10.34 | 1.18 | 1.50 | 4.57 | 0.14 | 0.01 | 11.95 |
| 12 | 108 | 135.63 | 0.00 | 80.16 | 1.07 | 8.31 | 0.00 | 0.00 | 34.25 |
| 13 | 10 | 10.71 | 1.50 | 2.81 | 0.22 | 3.18 | 0.00 | 0.00 | 9.18 |
| 14 | 20 | 24.17 | 0.83 | 1.43 | 0.90 | 1.40 | 0.00 | 0.00 | 6.29 |
| 15 | 15 | 59.50 | 0.00 | 24.59 | 0.48 | 4.85 | 0.19 | 0.32 | 4.72 |
| 16 | 17 | 48.03 | 0.00 | 17.99 | 0.26 | 3.62 | 0.37 | 0.29 | 5.54 |
| 17 | 35 | 30.66 | 0.00 | 27.37 | 0.36 | 6.11 | 0.12 | 0.99 | 12.37 |
| 18 | 109 | 37.89 | 1.01 | 15.08 | 0.07 | 0.53 | 0.00 | 0.00 | 8.23 |
| 19 | 209 | 4.13 | 4.65 | 1.09 | 2.45 | 0.08 | 0.00 | 0.00 | 8.35 |
| 20 | 208 | 123.54 | 0.03 | 124.87 | 0.51 | 8.79 | 0.00 | 0.00 | 20.95 |
| 21 | 2 | 124.95 | 0.00 | 72.63 | 1.54 | 5.57 | 0.00 | 0.02 | 23.43 |
| 22 | 1 | 96.36 | 0.00 | 17.04 | 0.84 | 1.70 | 0.46 | 0.01 | 6.81 |

Figure 1

LF34/98: Beam Trawl Stations

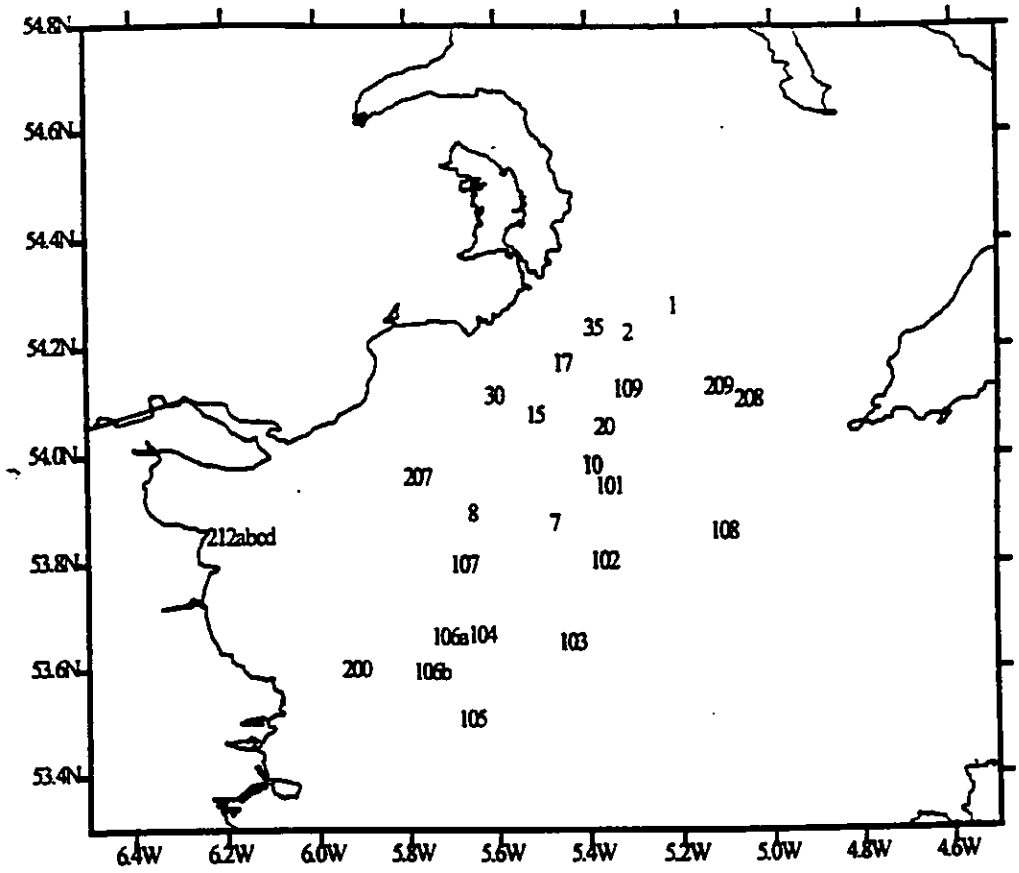



Figure 2

Size composition of "0" group *Nephrops* from beam trawl survey,
Pooled data from all stations and data for station 103 (<12mm CL)

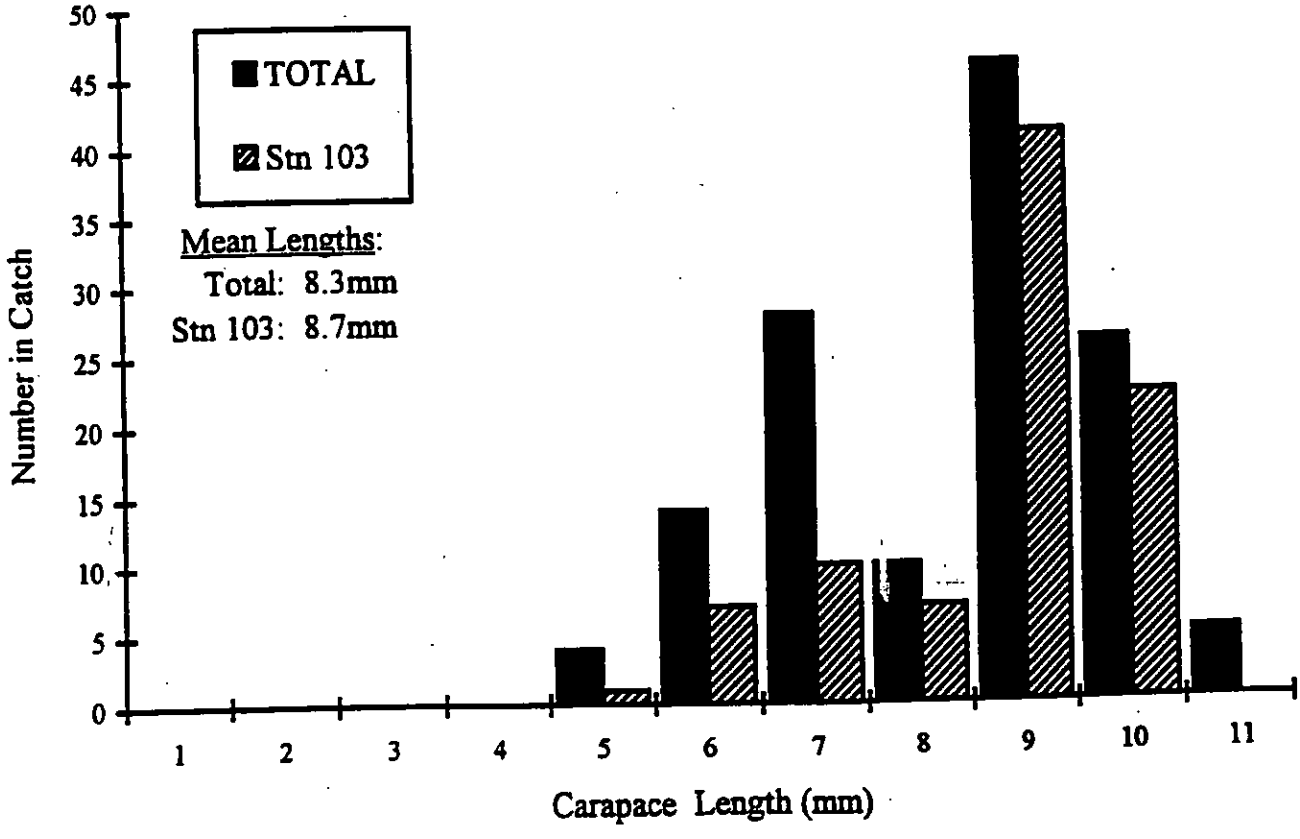


Figure 3

Position of trawled stations and Nephrops catch per nautical mile

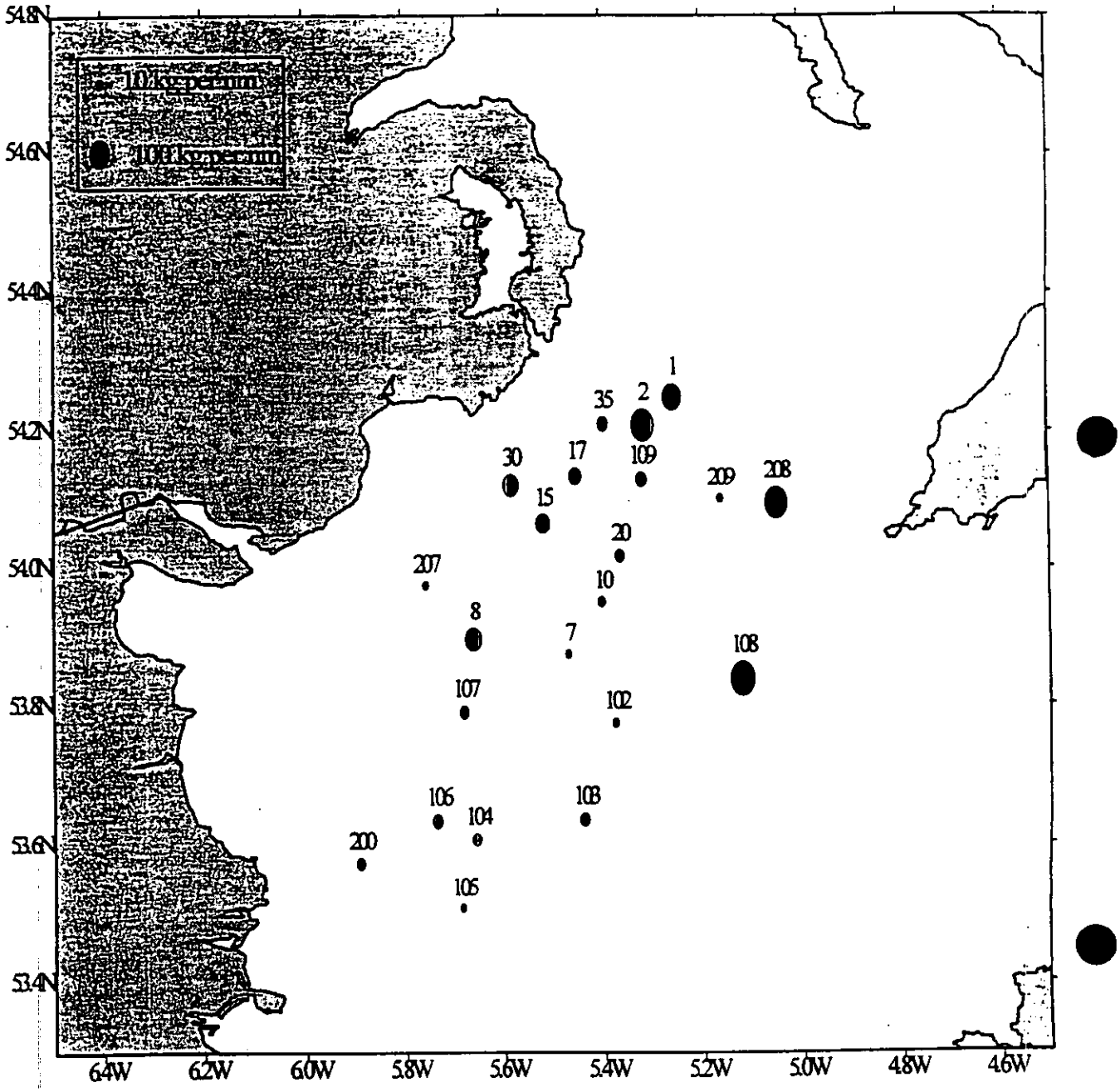


Figure 4

Mean Whiting Catch at Length per nautical mile

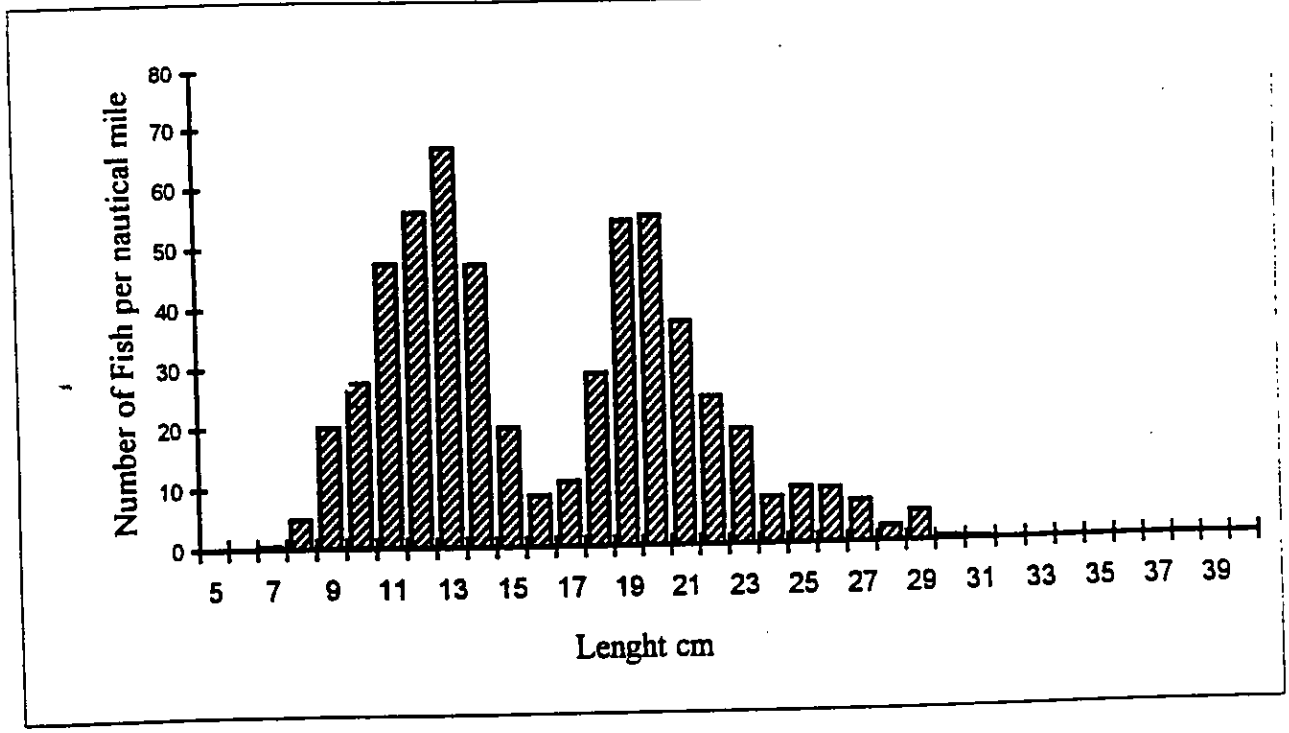
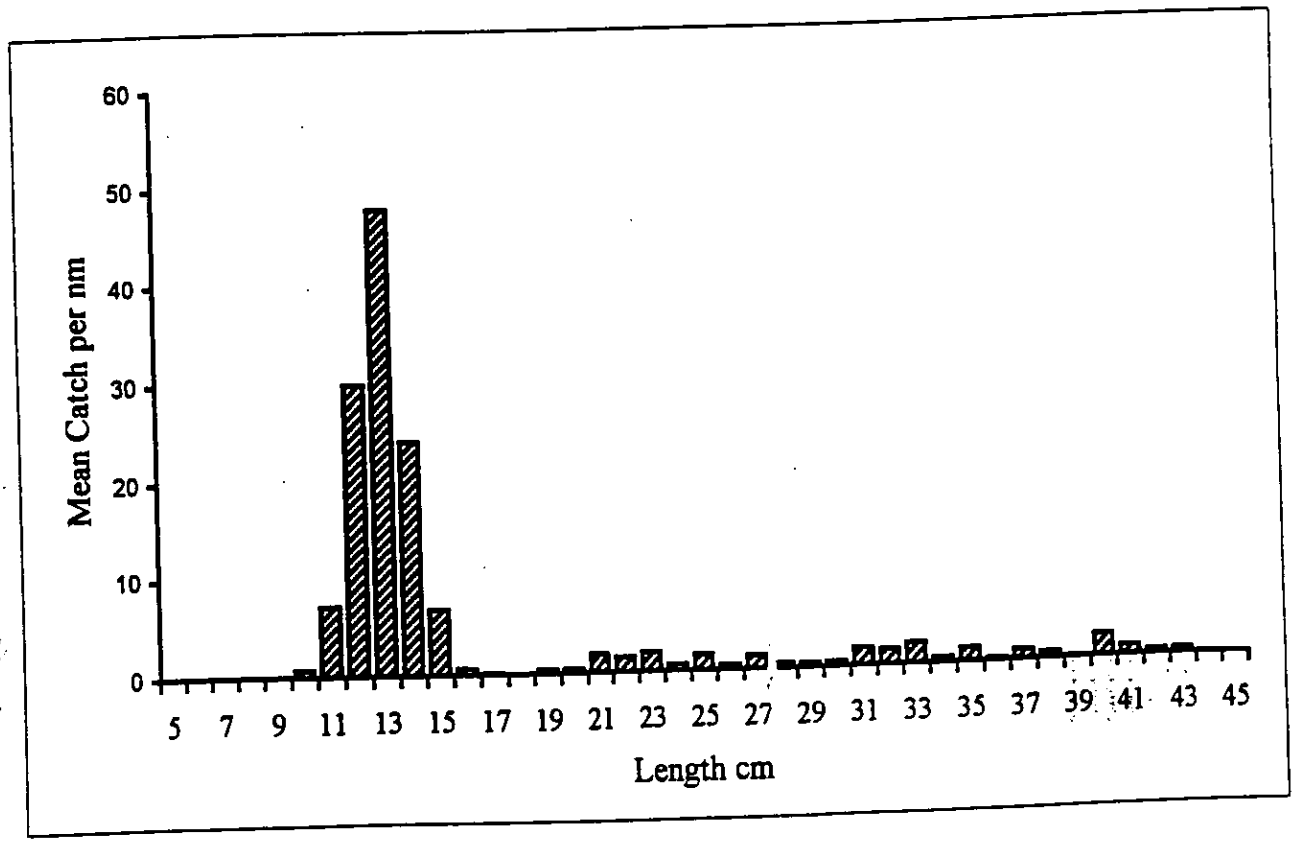



Figure 5

Mean Haddock Catch at Length per nautical mile



Appendix 1 Stations sampled during LF3498

**Beam Trawl**

| Date | Tow | Stn | lat in | long in | Time |
|---|---|---|---|---|---|
| 17-Aug | 1 | 2 | 54 13.27 | 5 18.900 | 11.43 |
| | 2 | 1 | 54 16.30 | 5 13.090 | 12.00 |
| | 3 | 35 | 54 13.81 | 5 23.280 | 13.56 |
| | 4 | 17 | 54 9.80 | 5 27.440 | 14.54 |
| | 5 | 30 | 54 6.23 | 5 36.390 | 16.27 |
| | 6 | 207 | 53 57.27 | 5 46.730 | 18.38 |
| 18-Aug | 7 | 208 | 54 5.91 | 5 3.200 | 9.00 |
| | 8 | 209 | 54 7.30 | 5 7.160 | 11.00 |
| | 9 | 109 | 54 6.99 | 5 18.940 | 13.00 |
| | 10 | 20 | 54 2.80 | 5 21.980 | 14.00 |
| | 11 | 10 | 53 58.65 | 5 23.690 | 14.40 |
| | 12 | 101 | 53 56.34 | 5 21.300 | 17.32 |
| | 13 | 15 | 54 4.10 | 5 31.000 | 18.55 |
| | 14 | 10 | 53 58.52 | 5 23.510 | 21.50 |
| 19-Aug | 15 | 108 | 53 51.31 | 5 6.470 | 9.00 |
| | 16 | 102 | 53 48.00 | 5 22.000 | 11.00 |
| | 17 | 7 | 53 52.20 | 5 28.500 | 13.00 |
| | 18 | 8 | 53 53.24 | 5 39.340 | 14.42 |
| | 19 | 107 | 53 47.60 | 5 40.560 | 15.50 |
| | 20 | 103 | 53 38.77 | 5 26.290 | 18.30 |
| 20-Aug | 21 | 104 | 53 39.56 | 5 38.230 | 8.06 |
| | 22 | 106a | 53 39.34 | 5 42.580 | 9.35 |
| | 23 | 106b | 53 35.30 | 5 44.970 | 10.28 |
| | 24 | 105 | 53 30.01 | 5 39.660 | 12.39 |
| | 25 | 200 | 53 35.62 | 5 55.200 | 15.00 |
| | 26 | 212a | 53 50.62 | 6 10.090 | 18.32 |
| | 27 | 212b | 53 50.33 | 6 9.090 | 19.30 |
| | 28 | 212c | 53 50.26 | 6 9.840 | 20.16 |
| | 29 | 212d | 53 50.26 | 6 9.640 | 21.00 |

***Nephrops* Trawl**

| Date | Tow | Stn | lat in | long in | lat out | long out |
|---|---|---|---|---|---|---|
| 21-Aug | 1 | 105 | 53 30.50 | 5 40.94 | 53 29.34 | 5 37.47 |
| 23-Aug | 2 | 200 | 53 34.42 | 5 53.44 | 53 36.32 | 5 55.65 |
| | 3 | 106 | 53 38.11 | 5 44.02 | 53 35.65 | 5 42.34 |
| | 4 | 104 | 53 36.51 | 5 39.22 | 53 38.83 | 5 37.69 |
| 24-Aug | 5 | 30 | 54 7.31 | 5 34.91 | 54 5.33 | 5 37.22 |
| | 6 | 207 | 53 58.53 | 5 45.39 | 53 56.32 | 5 47.52 |
| | 7 | 8 | 53 53.76 | 5 39.55 | 53 51.24 | 5 39.62 |
| | 8 | 107 | 53 47.47 | 5 40.71 | 53 45.35 | 5 41.86 |
| 25-Aug | 9 | 103 | 53 38.25 | 5 26.19 | 53 40.63 | 5 24.49 |
| | 10 | 102 | 53 46.57 | 5 22.5 | 53 48.95 | 5 21.19 |
| | 11 | 7 | 53 52.48 | 5 28.11 | 53 27.55 | 5 27.55 |
| | 12 | 108 | 53 50.36 | 5 7.18 | 53 52.60 | 5 6.16 |
| | 13 | 10 | 53 57.11 | 5 24.09 | 53 59.61 | 5 23.59 |
| | 14 | 20 | 54 1.10 | 5 21.94 | 54 0.54 | 5 26.20 |
| 26-Aug | 15 | 15 | 54 3.92 | 5 31.06 | 54 6.56 | 5 30.18 |
| | 16 | 17 | 54 8.12 | 5 27.17 | 54 10.63 | 5 26.61 |
| | 17 | 35 | 54 12.67 | 5 23.79 | 54 14.87 | 5 22.19 |
| | 18 | 109 | 54 7.86 | 5 19.29 | 54 5.30 | 5 18.79 |
| | 19 | 209 | 54 6.22 | 5 9.75 | 54 8.27 | 5 6.92 |
| | 20 | 208 | 54 5.80 | 5 2.94 | 54 8.00 | 5 0.39 |
| 27-Aug | 21 | 2 | 54 12.57 | 5 19.03 | 54 15.04 | 5 5.19 |
| | 22 | 1 | 54 15.02 | 5 15.45 | 54 17.48 | 5 16.29 |