

# **FISHERIES SCIENCE PARTNERSHIP**

## **Report on catches of cod and haddock in the western Irish Sea by FV Benaiah IV in spring 2004**

**Fisheries Management Group  
CEFAS, Lowestoft  
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## **Introduction**

The DEFRA-funded Fisheries Science Partnership was established between DEFRA<sup>1</sup>, CEFAS<sup>2</sup> and NFFO<sup>3</sup> for the duration of financial year 2003/4. The objective was to enable the fishing industry to demonstrate the results of commercial fishing in a number of priority fishing areas nominated by the NFFO. Fishing vessels were chartered to fish commercially, usually under dispensation from the quota regulations, to obtain new data on the catch rate and size distribution of target species, and in some cases by-catch species. Ten projects were scheduled and completed. The charter of suitable fishing vessels was arranged by the NFFO, and work plans were developed between NFFO, CEFAS and the vessel skippers. CEFAS deployed sea-going staff to record raw data that were subsequently returned to the laboratory at Lowestoft for input and analysis.

CEFAS acknowledges the help of the NFFO and skippers during the conduct of these studies. The data and results are the intellectual property of the vessel skippers, CEFAS and NFFO.

1. Department of Environment, Food and Rural Affairs
2. Centre for Environment, Fisheries and Aquaculture Science
3. National Federation of Fishermen's Organisations

## **The western Irish Sea cod project**

This report presents the initial results of an FSP project carried out on the semi-pelagic trawl fishery for cod on the Irish side of the Irish Sea in spring 2004. The project used a commercial trawler, the FV Benaiah IV, from 16 Feb to 9 March equipped with a 100 mm mesh codend. The work plan involved trawling under dispensation from the quota regulations on grounds chosen by the vessel skipper. No otter trawl survey was undertaken by CEFAS in this region in the same season. [The closest in time is the recently started Irish and Celtic Sea GFS on CEFAS Endeavour in November/December 2003.] An otter trawl survey was undertaken in the Irish Sea by Dept. of Agriculture and Rural Development for Northern Ireland in spring 2004. CEFAS has been advised that the results of this survey are available for comparison with the FSP survey results in future discussions. However, the present report is restricted for practical reasons to the data collected by CEFAS.

Here we present for cod and haddock only:

- Catch per unit effort by location;
- Discarding percentages;
- The distribution of numbers at length for these commercial species.

Cod taken during this survey were also used for maturity, DNA, and stomach content studies and some stations were fished with short tows to allow capture of cod in good condition for tagging. This work is not reported here but preliminary details will be found in the cruise report in Appendix 2.

## **Methods**

The FV Benaiah IV (B 350) is a steel trawler of 20m overall length, built in 1987, and powered by a 451 Kw engine.

The fishing gear used for this survey was a semi- pelagic trawl with a maximum mesh size of 500 cm. The codend was made of 100mm mesh constructed of single braided twine and was fitted with a 200mm lifting bag. 8ft pelagic trawl doors were used. A door spread of approximately 51 metres was usually achieved. Towing times were variable between 0.8 and 12.0 hours with an average of 6.4 hours. Shorter times were used at most stations after haul 24 (exceptions: 29, 35, 39) in order to collect cod in good condition for tagging. . All cod and haddock caught were measured and classified as 'discarded' or 'retained' according to advice from the fishing crew. Otoliths for age reading were collected from cod.

## Results

### *Data summary*

The position, date, and time of the commercial hauls, along with numbers of cod and haddock caught, are shown in Appendix 1 . Other species were not recorded. The catch data presented in the report below are converted to numbers per hour of towing (catch per hr.) so as to diminish the effects on catch of variable tow times. Cruise reports prepared immediately after the FSP survey can be found as Appendix 2 and were drawn upon in the preparation of this text.

### *Fishing stations*

The survey comprised 4 trips from Kilkeel, all designated as Ben 1/04. Trip dates, mesh sizes, haul numbers, gear, and average towing hours are summarised below in Table 1. Tows tended to be shorter on the third and fourth trips when more cod were collected for tagging (see Appendix 2). Locations of all tows are shown in Figure 1 as the mid point between shooting and hauling positions.

**Table 1.** W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar 2004: details of fishing activity. .

<b>Cruise code</b>	<b>Dates in 2004</b>	<b>Stations</b>	<b>N hauls</b>	<b>Locality in Irish Sea</b>	<b>Average tow hrs.</b>
Ben 1/04	16-21 Feb	1-14	14	SW of Isle of Man + E of Kilkeel	7.51
	23-26 Feb	15-23	9	SE of Kilkeel + SW of Isle of Man	8.82
	4-6 Mar	24-35	12	S and SE of Kilkeel	4.20
	8-9 Mar	36-42	7	SE of Kilkeel	4.65

### *Geographic plots by species*

Catches were composed mostly of cod and haddock but some saithe, plaice, dab, and whiting were also recorded. These secondary species were not measured, nor counted in all cases and are not reported here.

#### 1. Cod - Fig. 2a-b.

The best catches of cod, up to 28 fish per hour, were taken just to the southwest of the Isle of Man (fig. 2a). These were among the earliest stations to be fished (fig. 2b). The length distribution mainly comprised cod of 40 to 80 cm with a peak in the range 55 to 75 cm, but some 80 to 100 cm cod were also caught, possibly because of the long towing times used. The age structure was dominated by three year old cod of the 2001 year-class, with a few 2 year olds and some older fish. No cod were discarded.. Except for the slightly higher number of large fish, the size and age distribution caught by Benaiah is very similar to that caught in the eastern Irish Sea by FV Kiroan. (See FSP report, 2004, for NE Irish Sea).

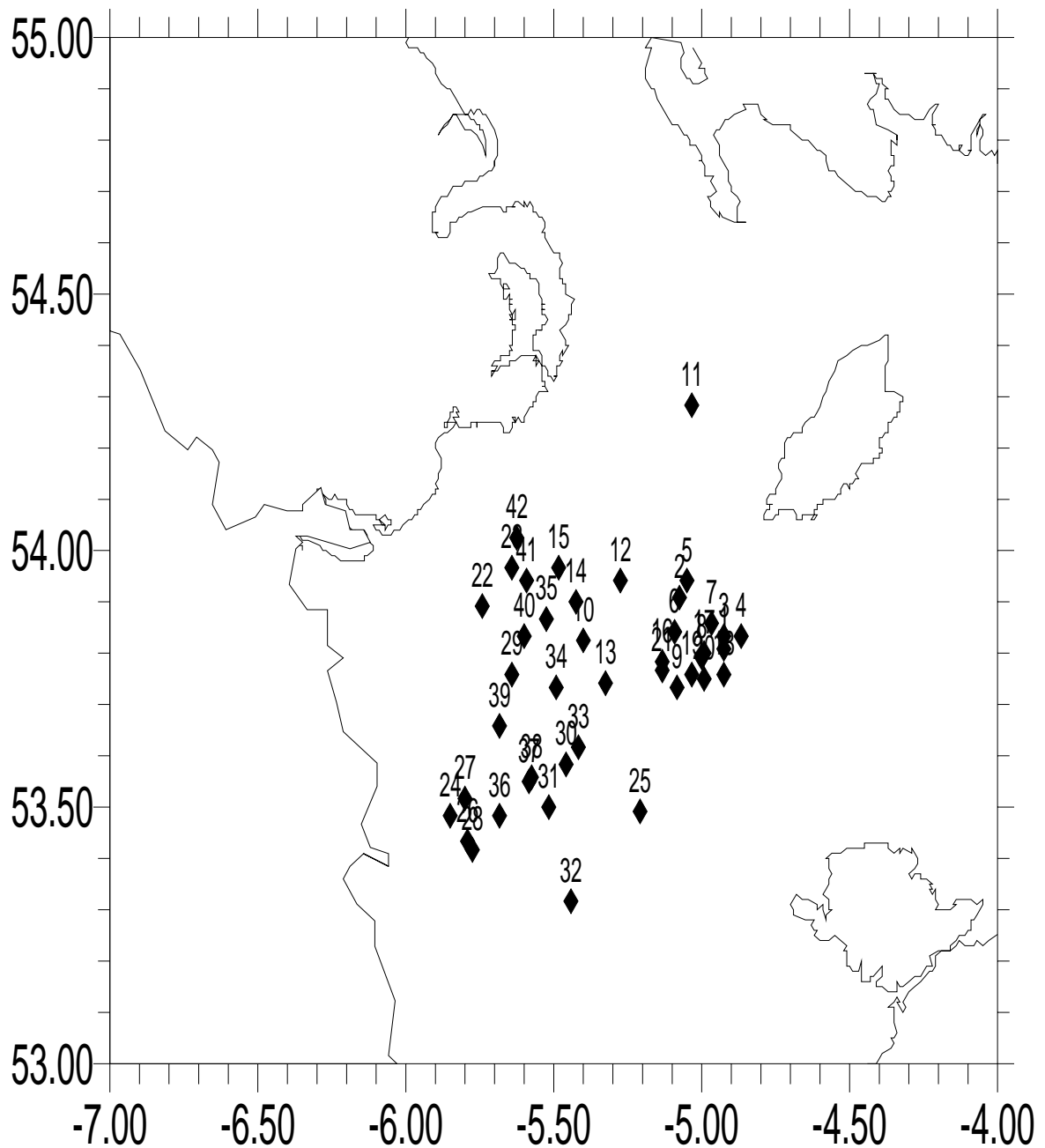
#### 2. Haddock - Fig. 3a-c.

Large catches of haddock, up to 1414 fish per hour, were caught in Irish waters just NE of Dublin. See fig. 3a. The next best grounds were to the SW of the Isle of Man where catches generally between 50 to 150 fish per hour were taken. Catch rates for haddock were often much higher than for cod, and there appeared to be little or no coupling between the two species. (Compare figs. 2b and 3d). . The percentages (by number) of the catch discarded are shown in fig. 3b. At one station SW of Isle of Man, 100% of the haddock caught were discarded. Elsewhere, the percentages were much lower. The length frequency distribution shown in fig. 3c indicates that most haddock were in the size range 30 to 50cm and only a small proportion of the total catch of the survey was below the minimum landing size of 30 cm. It also suggests that the catch was dominated by 1 and 2 year-old fish but no otoliths were collected from haddock to confirm this.

## **Summary and conclusions**

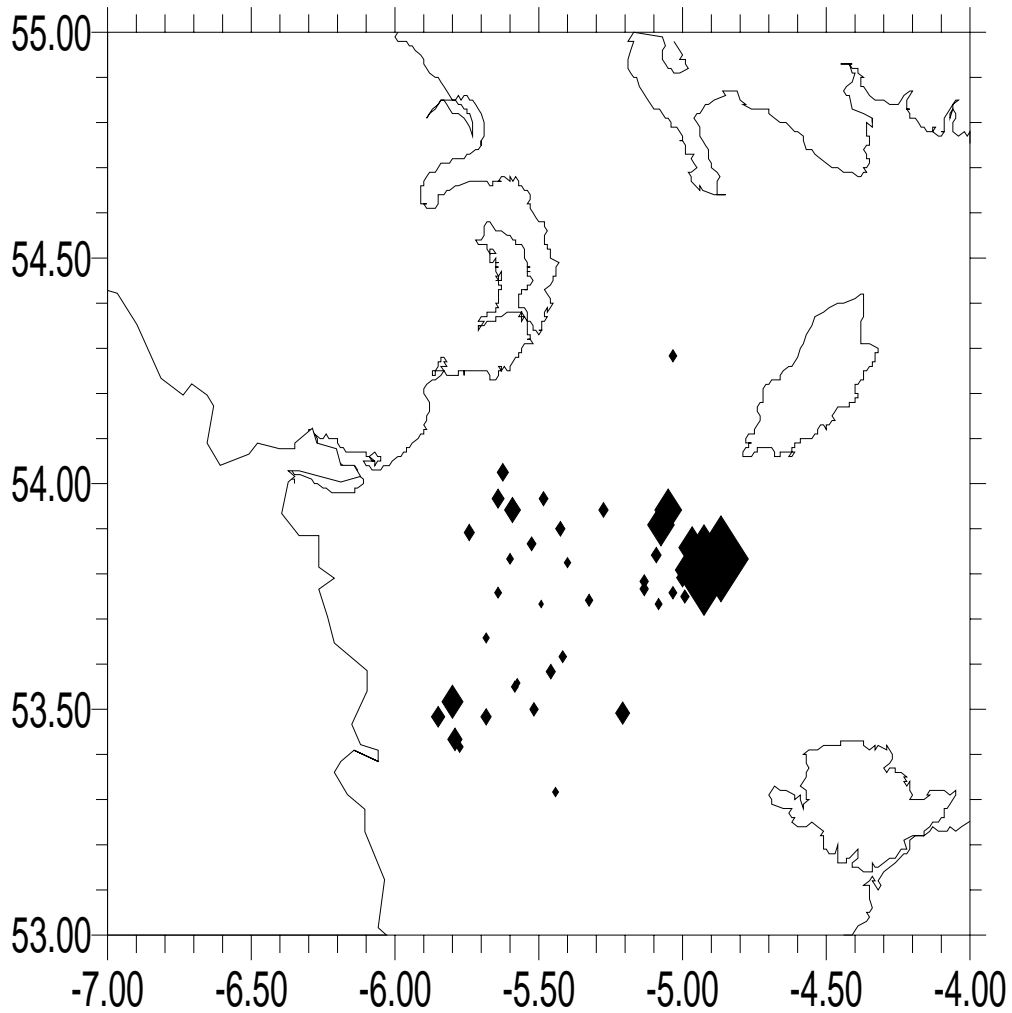
1. Catches of cod taken by the FV Benaiah IV with a semi-pelagic trawl and 100 mm codend were patchy, with the largest numbers per hour taken SW of the Isle of Man. Catches were dominated by 3 year-old fish. The gear took very few undersized fish and there was no discarding of cod.
2. Catches of haddock were often larger than those for cod but were also patchy. The largest numbers per hour were taken just to the NE of Dublin. Discarding of haddock occurred but except at one location formed only a small percentage of the total catch. Judging only from the length distribution, catches of haddock were apparently dominated by 1 and 2 year-old fish.
3. There was no obvious coupling between catch rates of cod and haddock.

**Fig. 1.**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar 2004:**  
**Station positions**



Diamond = Ben 1/04

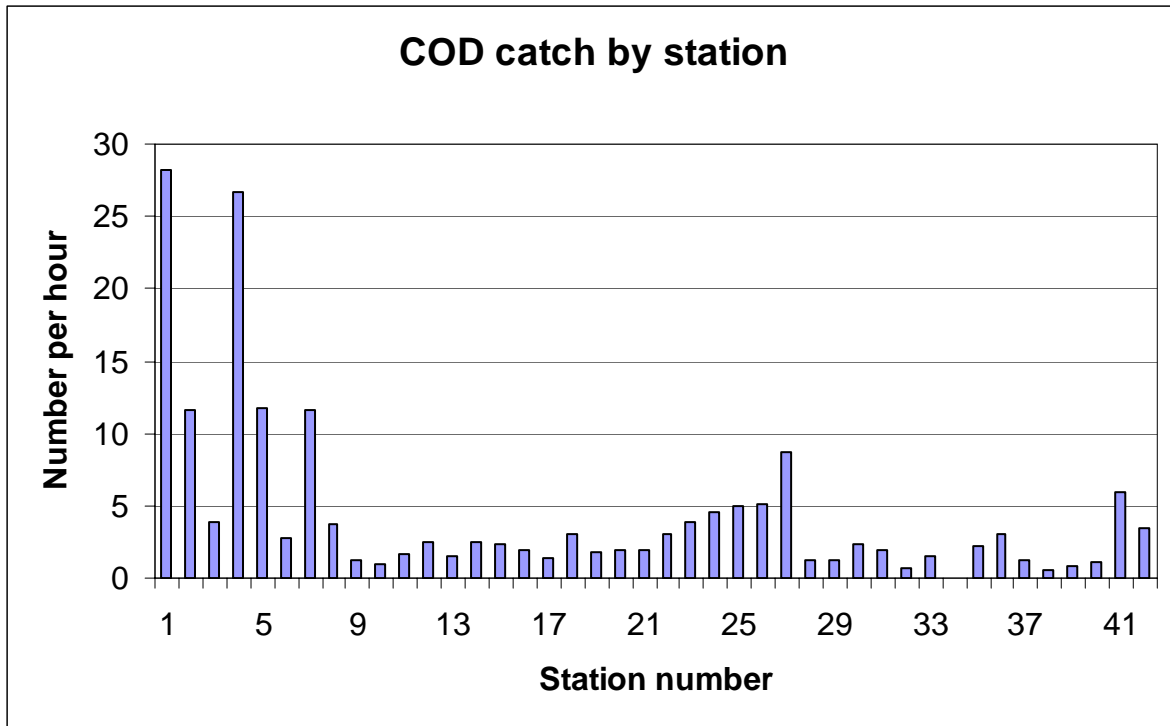
**Fig. 2(a).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar 2004:**  
**COD: catch per hour**



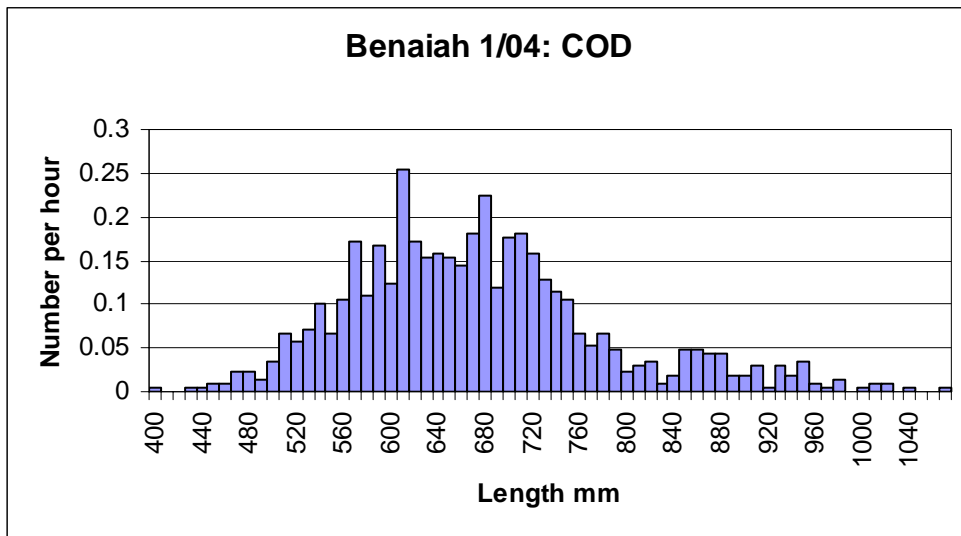
Diamond = Ben 1/04  
Scaling: Largest symbol = 28 fish per hr.

Note: No cod were discarded

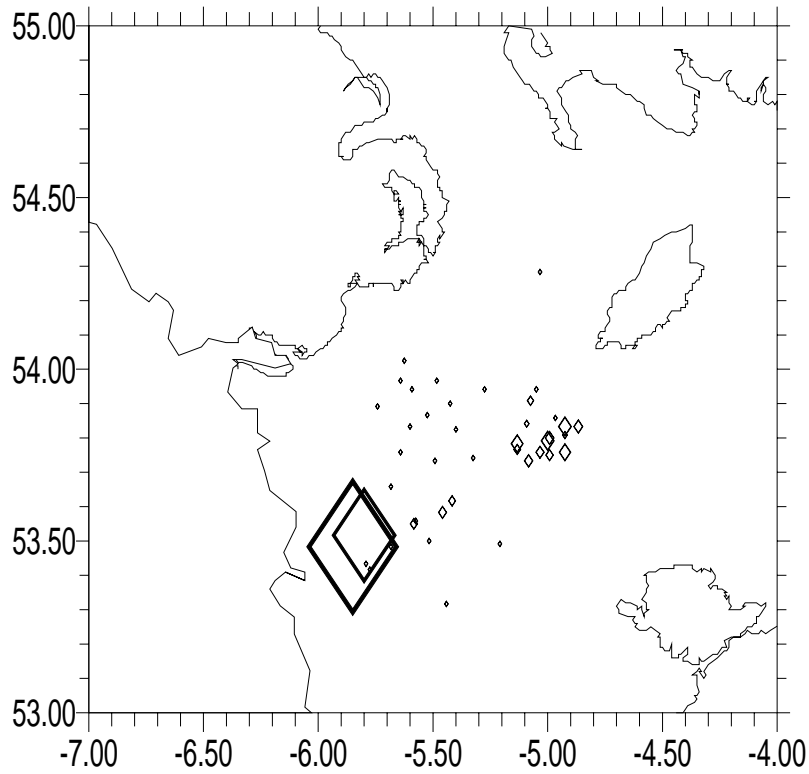
**Fig. 2(b).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar**  
**2004:**



**Fig. 2(c).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar**  
**2004:**  
**COD length frequency distribution**

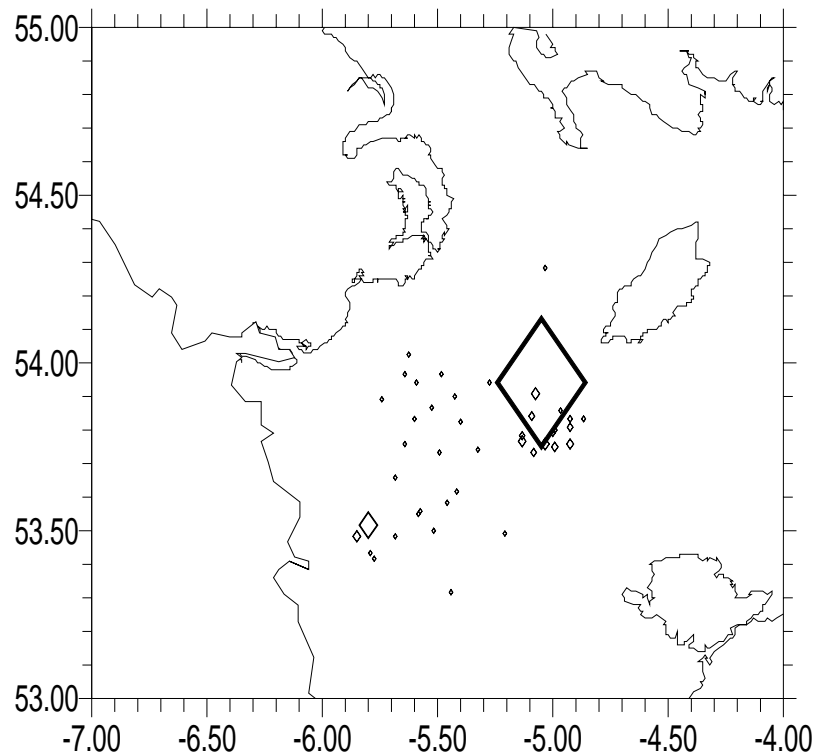


**Fig. 3(a).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar 2004:**  
**HADDOCK: catch per hour**



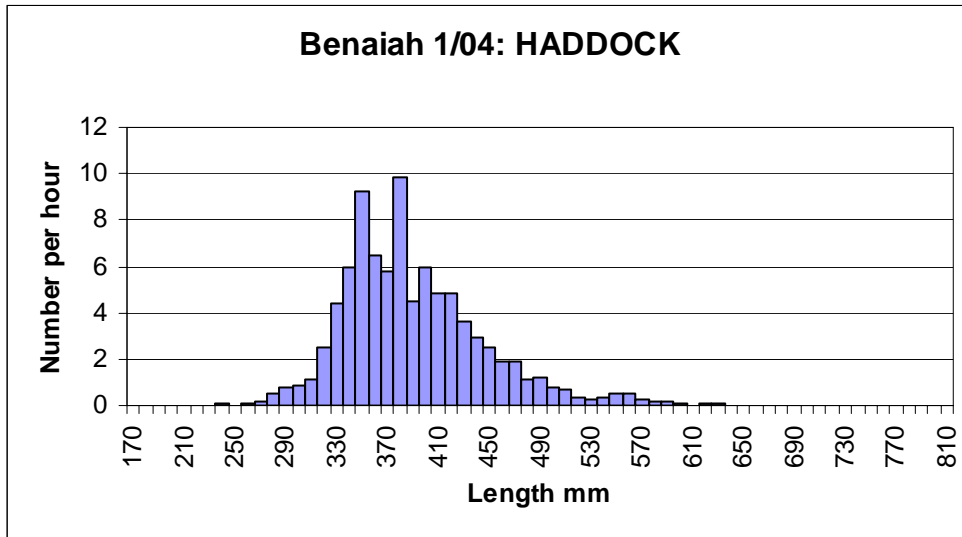
Diamond = Ben 1/04  
Scaling: Largest symbol = 1414 fish per hr.

**Fig. 3(b). HADDOCK: % discarded by number**

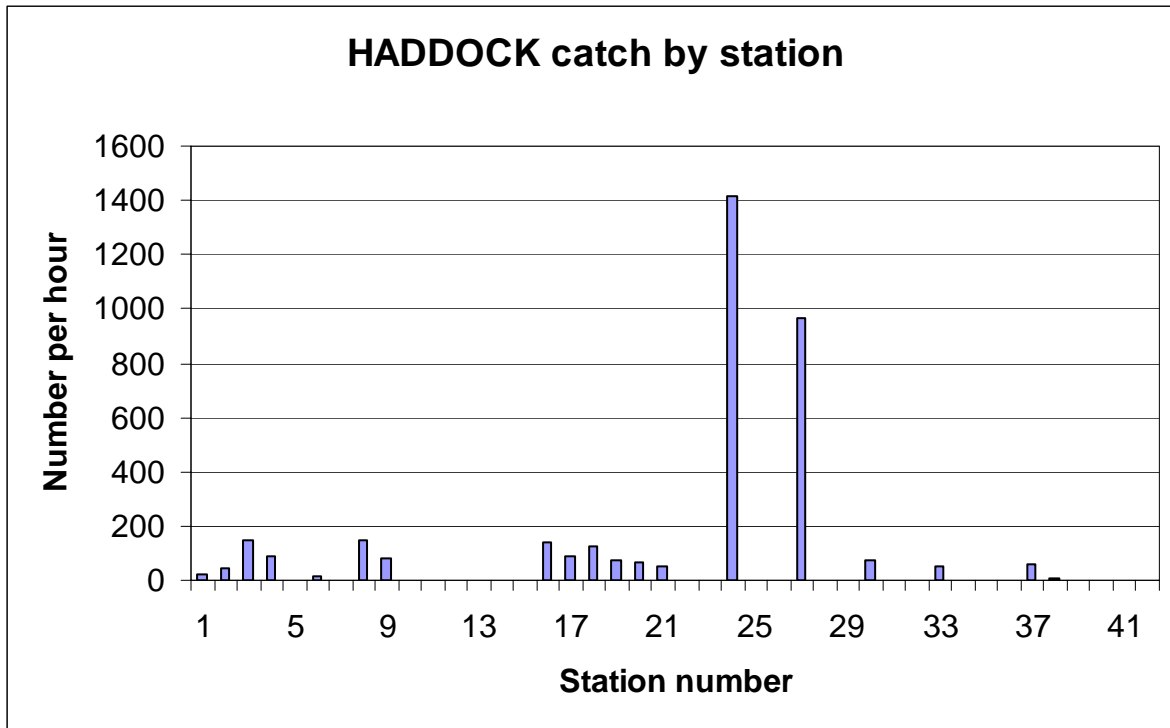


Scaling: Largest symbol = 100%.

**Fig. 3(c).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar**  
**2004:**  
**HADDOCK length frequency distribution**



**Fig. 3(d).**  
**W Irish Sea FSP semi-pelagic trawl survey, Feb-Mar**  
**2004:**



**APPENDIX 1: W Irish Sea FSP Survey, spring 2004:** Station and catch details for 2 species of fish.

Abbreviations: COD\_N=cod numbers, HAD\_N=haddock numbers. (Fractional numbers arise from sample raising factors.)

CruiseName	Stn	Rectangle	Gear	Mesh mm	Shot Lon	Shot Lat	Haul Lon	Haul Lat	Date shot	Time shot	Tow hrs	COD_N	HAD_N
BEN 1/04	1	36E5	Semi-pelagic trawl	100	-4.97	53.80	-4.88	53.82	16-Feb-04	10:45	1.92	54	38
BEN 1/04	2	36E4	Semi-pelagic trawl	100	-5.05	53.85	-5.10	53.97	16-Feb-04	13:40	5.67	66	254
BEN 1/04	3	36E5	Semi-pelagic trawl	100	-4.88	53.78	-4.97	53.88	16-Feb-04	20:15	10.75	41	1617
BEN 1/04	4	36E5	Semi-pelagic trawl	100	-4.87	53.83	-4.87	53.83	17-Feb-04	8:30	4.50	120	387
BEN 1/04	5	36E5	Semi-pelagic trawl	100	-4.90	53.95	-5.20	53.93	17-Feb-04	13:30	4.25	50	13
BEN 1/04	6	36E5	Semi-pelagic trawl	100	-5.33	53.93	-4.85	53.75	17-Feb-04	19:00	12.00	33	216
BEN 1/04	7	36E5	Semi-pelagic trawl	100	-4.90	53.93	-5.03	53.78	18-Feb-04	8:00	5.50	64	0
BEN 1/04	8	36E5	Semi-pelagic trawl	100	-4.98	53.80	-5.02	53.78	18-Feb-04	15:10	5.83	22	880
BEN 1/04	9	36E4	Semi-pelagic trawl	100	-5.02	53.78	-5.15	53.68	18-Feb-04	21:25	10.08	13	794
BEN 1/04	10	36E4	Semi-pelagic trawl	100	-5.20	53.73	-5.60	53.92	19-Feb-04	8:30	8.75	8	0
BEN 1/04	11	37E5	Semi-pelagic trawl	100	-4.98	54.38	-5.08	54.18	20-Feb-04	3:50	4.83	8	0
BEN 1/04	12	37E4	Semi-pelagic trawl	100	-5.20	54.00	-5.35	53.88	20-Feb-04	10:10	8.33	21	0
BEN 1/04	13	36E4	Semi-pelagic trawl	100	-5.40	53.55	-5.25	53.93	20-Feb-04	19:00	13.50	21	0
BEN 1/04	14	36E4	Semi-pelagic trawl	100	-5.22	53.95	-5.63	53.85	21-Feb-04	10:15	9.25	23	0
BEN 1/04	15	37E4	Semi-pelagic trawl	100	-5.50	54.05	-5.47	53.88	23-Feb-04	3:30	7.00	16	0
BEN 1/04	16	36E4	Semi-pelagic trawl	100	-5.33	53.80	-4.93	53.77	23-Feb-04	13:00	7.50	15	1027
BEN 1/04	17	36E4	Semi-pelagic trawl	100	-5.08	53.77	-4.90	53.83	23-Feb-04	21:00	12.50	17	1072
BEN 1/04	18	36E5	Semi-pelagic trawl	100	-4.92	53.77	-4.93	53.75	24-Feb-04	10:15	5.50	17	705
BEN 1/04	19	36E5	Semi-pelagic trawl	100	-4.88	53.72	-5.18	53.80	24-Feb-04	16:15	5.75	10	432
BEN 1/04	20	36E4	Semi-pelagic trawl	100	-4.90	53.72	-5.08	53.78	24-Feb-04	22:39	10.35	20	667
BEN 1/04	21	36E4	Semi-pelagic trawl	100	-4.97	53.78	-5.30	53.75	25-Feb-04	10:00	8.00	16	430

**APPENDIX 1 continued: W Irish Sea FSP Survey, spring 2004:** Station and catch details for 2 species of fish.  
 Abbreviations: COD\_N=cod numbers, HAD\_N=haddock numbers. (Fractional numbers arise from sample raising factors.)

CruiseName	Stn	Rectangle	Gear	Mesh mm	Shot Lon	Shot Lat	Haul Lon	Haul Lat	Date shot	Time shot	Tow hrs	COD_N	HAD_N
BEN 1/04	22	36E4	Semi-pelagic trawl	100	-5.93	53.95	-5.55	53.83	25-Feb-04	22:45	10.75	32	0
BEN 1/04	23	36E4	Semi-pelagic trawl	100	-5.58	53.95	-5.70	53.98	26-Feb-04	10:00	12.00	47	0
BEN 1/04	24	35E4	Semi-pelagic trawl	100	-5.87	53.48	-5.83	53.48	04-Mar-04	3:30	5.50	25	7778
BEN 1/04	25	35E4	Semi-pelagic trawl	100	-5.73	53.47	-4.68	53.52	04-Mar-04	9:40	1.00	5	0
BEN 1/04	26	35E4	Semi-pelagic trawl	100	-5.77	53.40	-5.82	53.47	04-Mar-04	11:40	1.17	6	0
BEN 1/04	27	35E4	Semi-pelagic trawl	100	-5.78	53.48	-5.82	53.55	04-Mar-04	14:15	2.52	22	2439
BEN 1/04	28	35E4	Semi-pelagic trawl	100	-5.78	53.47	-5.77	53.37	04-Mar-04	17:35	0.83	1	0
BEN 1/04	29	36E4	Semi-pelagic trawl	100	-5.87	53.60	-5.42	53.92	04-Mar-04	20:00	11.50	14	16
BEN 1/04	30	36E4	Semi-pelagic trawl	100	-5.45	53.62	-5.47	53.55	05-Mar-04	9:30	1.67	4	125
BEN 1/04	31	36E4	Semi-pelagic trawl	100	-5.48	53.52	-5.55	53.48	05-Mar-04	11:45	1.50	3	0
BEN 1/04	32	35E4	Semi-pelagic trawl	100	-5.43	53.30	-5.45	53.33	05-Mar-04	15:40	1.50	1	0
BEN 1/04	33	36E4	Semi-pelagic trawl	100	-5.45	53.55	-5.38	53.68	05-Mar-04	19:00	2.53	4	140
BEN 1/04	34	36E4	Semi-pelagic trawl	100	-5.43	53.70	-5.55	53.77	05-Mar-04	22:20	9.67	0	25
BEN 1/04	35	36E4	Semi-pelagic trawl	100	-5.57	53.65	-5.48	54.08	06-Mar-04	8:30	11.00	24	0
BEN 1/04	36	35E4	Semi-pelagic trawl	100	-5.72	53.48	-5.65	53.48	08-Mar-04	6:50	4.67	14	0
BEN 1/04	37	36E4	Semi-pelagic trawl	100	-5.60	53.48	-5.57	53.62	08-Mar-04	13:00	2.50	3	148
BEN 1/04	38	36E4	Semi-pelagic trawl	100	-5.60	53.55	-5.55	53.57	08-Mar-04	16:15	3.75	2	17
BEN 1/04	39	36E4	Semi-pelagic trawl	100	-5.73	53.65	-5.63	53.67	08-Mar-04	21:50	10.17	9	0
BEN 1/04	40	36E4	Semi-pelagic trawl	100	-5.60	53.83	-5.60	53.83	09-Mar-04	9:30	4.50	5	0
BEN 1/04	41	36E4	Semi-pelagic trawl	100	-5.65	53.90	-5.53	53.98	09-Mar-04	15:00	3.00	18	0
BEN 1/04	42	36E4	Semi-pelagic trawl	100	-5.65	53.98	-5.60	54.07	09-Mar-04	18:30	4.00	14	0

## **APPENDIX 2**

### **REPORT OF CRUISE FSP 7**

#### **BENIAH IV, Kilkeel. 16 February to 10 March 2004**

##### **AIMS:**

1. To obtain accurate fisheries data on the distribution and abundance of spawning cod in the Western Irish Sea.
2. To obtain cod fecundity samples
3. To tag and release best condition cod using Howitt tags. Assess possibility of work being carried out with data storage tags.
4. To obtain samples of cod DNA
5. To estimate stomach contents of otolithed fish.

##### **NARRATIVE:**

BENIAH IV sailed from Kilkeel at 5.30am on Monday 16 February. We proceeded to an area SW of the Isle of Man, where we fished for 3 days completing 8 tows. We then moved closer in SE of Kilkeel where we completed 2 tows before going in to Kilkeel to collect more ice and fresh water. We sailed again later the same evening and continued to fish E of Kilkeel for the following two days completing 4 more tows before returning to Kilkeel on the evening of Saturday 21 February.

BENIAH IV sailed again just after midnight on Monday 23<sup>rd</sup> February when we were joined by Richard Briggs from DARD Aquatic Systems Group. We fished in areas SE of Kilkeel, moving to SW Isle of Man and SSW Isle of Man over the following 4 days completing 9 tows before returning to Kilkeel on the evening of Thursday 26 February when Richard Briggs left the boat.

The programme was then put on hold whilst efforts were made to secure permission to fish in Irish Waters within the closed area. This permission was granted on Wednesday 3 March.

BENIAH IV sailed just after midnight on Thursday 4 March when we were joined by Alan Henning from DARD Fisheries Division. We proceeded to an area S of Kilkeel and continued to fish S and SE of Kilkeel for the following 3 days completing 12 tows. BENIAH IV then returned to Kilkeel on the evening of Saturday 6 March.

BENIAH IV sailed again just after midnight on Monday 8 March and fished in an area SE of Kilkeel for the following 2 days, completing 7 more tows before returning to Kilkeel on the evening of 9 March, docking just after midnight at the end of the survey.

##### **GEAR:**

The fishing gear used for this survey was a semi- pelagic trawl with a maximum mesh size of 198mm and minimum mesh size of 100mm, single twine with a 200mm lifting bag. 8ft pelagic trawl doors were used.

#### RESULTS:

1. A total of 675 cod and 1338 Haddock were measured and 346 cod were otolithed, with maturity and stomach contents also being recorded.
2. Due to operational constraints it was not possible to collect fecundity samples on this trip.
3. 93 cod were tagged and released. Due to the low catch rates it was not considered viable to attempt work with data storage tags.
4. 98 DNA samples were taken.
5. Stomach contents (Fullness) was estimated for all of the 346 cod otolithed.

My thanks to the skipper and crew of BENIAH IV and to Richard Briggs and Alan Henning for their help on this survey.

Jennie Keable  
12 March 2004