

Final Report

Programme 8: Gear selectivity in the Irish Sea

Part 1: Eastern Irish Sea plaice fishery

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Summary

1. The purpose of this component of Fisheries Science Partnership Programme 8 (Gear Selectivity in the Irish Sea) was to demonstrate the effect of cod-end mesh size on the catch composition and quantities of fish discarded in the eastern Irish Sea plaice fishery, with particular emphasis on plaice and cod. The fishing vessel *Kiroan* was chartered to carry out 15 days of fishing with a twin-rig otter trawl on the plaice fishing grounds off Morecambe Bay during September and October 2004. Diamond-mesh cod-ends of mesh size 110mm were fitted for 38 hauls and a mesh size of 80mm for 26 hauls.
2. Nearly five times as many under-sized plaice were caught and discarded using 80mm cod-ends compared with 110mm mesh. Most of the plaice discards were fish below the minimum landing size of 27cm.
3. Although discarding of plaice increased substantially when 80mm cod-ends were fitted, this mesh size also caught 70% more legal-sized plaice (>MLS of 27cm) by number and 60% more by weight, mainly due to the greater catch rate of 27 – 38cm plaice compared with the 110mm nets.
4. The mean catch rate of whiting (in numbers per hour) was 14 times higher in the 80mm nets compared with the 110mm nets. All the whiting were discarded, including many fish above the minimum landing size of 27cm.
5. Catch rates of sole and cod were very low. Ten out of 64 hauls contained either one or two cod of 45 – 72 cm long, which were retained for landing. A sample of the discarded catch of one further haul contained a single cod of 13 cm. No other cod were recorded. The landed cod ranged from 1 to 3 years old.
6. Substantially more fish of non-commercial species were caught in the 80mm mesh nets than in the 110 mm nets.
7. The age compositions of plaice landed by FV *Kiroan* during the FSP trips in autumn 2004 show a greater contribution from 3-year-olds and a reduced contribution from ages 5 – 7 than observed in the total international landings for VIIa in 2001 – 2003 and given by the ICES forecast of landings of plaice in 2004. This may reflect the timing of the FSP trips, which may have experienced a lower availability of large mature plaice than during the spawning period in spring.

Percentage age compositions

age	Landings 2001	Landings 2002	Landings 2003	FSP 80mm	FSP110mm	ICES forecast for 2004
2	6.9	9.1	4.6	2.3	2.1	4.2
3	24.4	27.7	20.9	41.1	37.9	18.0
4	31.0	26.3	33.0	31.1	32.8	36.5
5	16.6	18.6	18.7	13.7	14.1	20.4
6	9.8	9.9	12.0	5.1	6.2	10.5
7	6.0	4.3	7.1	3.6	3.5	5.3
8	3.0	2.2	2.1	2.1	2.3	2.4
9+	2.3	1.7	1.7	1.0	1.3	2.7

Introduction

A Fisheries Science Partnership was established between Defra¹, CEFAS² and NFFO³ for the duration of financial year 2003/4 with funding from Defra. A second programme was established in 2004/5. The objectives of the FSP are to enable the fishing industry, in collaboration with CEFAS, to provide independent and verifiable data on fish stocks, fishery catches and gear selectivity in a number of priority fishing areas. Fishing vessels were chartered to fish commercially to obtain new data on the distribution, catch rate and size distribution of target species, and in some cases by-catch species. Nine primary projects were scheduled for 2004/5. 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.

This report presents the results of the eastern Irish Sea component of FSP Programme 8, carried out on the fisheries for plaice in the eastern Irish Sea. The project used the commercial twin-rig trawler FV *Kiroan* from 9 September to 12 October 2004 to examine catch composition in 80mm and 110mm cod-ends whilst towing for plaice.

The cruise reports prepared by CEFAS seagoing staff are reproduced in Appendix 2. The work plan involved trawling under dispensation from the quota regulations. This Programme was new for 2004.

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

Objectives

The key operational aims of Programme 8, as proposed by NFFO, covered proposed work on the otter trawl whitefish fishery in the eastern Irish Sea as well as on the Nephrops fishery in the western Irish Sea. The full set of aims specified by NFFO for both areas was:

- Assess by-catches of juvenile demersal fish in commercial catches
- Investigate and develop effective discard reduction measures
- Provide data supporting re-evaluation of catch composition rules in VIIa
- Contribute towards responsible fishing practices
- Incorporate preliminary findings within the North Sea Nephrops Fisheries Science Partnership Programme
- Produce indicators of abundance and distribution complimentary to existing ICES/CEFAS data

These aims were further discussed and prioritised at a meeting between CEFAS, the NFFO and the skipper that took place on 13 August 2004 at Grimsby. For the eastern Irish Sea study, the following objectives were specified:

1. To examine the effect on catches of using 80mm and 110mm cod-ends in the eastern Irish Sea plaice fishery.

2. To investigate the by-catch of cod in the eastern Irish Sea plaice fishery

Methods

Vessels, gears and areas fished

The FV *Kiroan* (FD2) is a steel trawler of 21 m registered length with a 354 Kw engine. All fishing was carried out with a twin-rig trawl designed to catch flatfish. Fishing was carried out with 110 and 80 mm mesh cod-ends for alternate groups of hauls, both cod-ends being of the same mesh size for each haul. The groupings are shown in Table 1. The alternation of cod-end mesh was useful as an experimental design for comparing the selectivity characteristics of the nets because unwanted influences of location and timing on catches were reasonably balanced between the two mesh sizes. The influence of different average tow duration on the catch rates of the two cod-ends (Table 1) could not be evaluated.

Table 1. Eastern Irish Sea gear selectivity programme, cruise KIRO 2/04: details of fishing activities. All fishing carried out with a twin rig trawl.

Stations	Dates in 2004	Cod-end mesh size	N hauls	Average tow duration
1-5, 10, 12-22, 26-28, 32-33, 40-43, 47-49, 51-53, 55, 58-61, 64	9 Sept - 12 Oct	110 mm	38	4.0 hr
6-9, 11, 23-25, 29-31, 34-39, 44-46, 50, 54, 56-57, 62-63	10 Sept - 12 Oct	80 mm	26	2.8 hr

Sampling methods

The catches from both cod-ends were mixed for sampling. For each haul, the quantities of all finfish retained for landing were recorded, and length measures were carried out on all or a sample of each of the target species (data are given for both sexes of each species combined). The number of baskets of fish discarded for every basket of fish landed was estimated from a sample of catch sorted by the crew, allowing an estimate to be made of the total quantity of discards based on the total number of baskets of retained fish from the haul. One basket of discards was sorted to estimate the species composition and to record the lengths of target species. If insufficient time was available to process a full basket, a minimum of half a basket of discards was sorted.

The ratio of the total estimated number of baskets of discarded fish to the number of baskets of discards sorted provided a raising factor by which the numbers and length frequencies of fish of each species in the sample could be raised to the total numbers discarded. Due to the estimation procedure described above, the quantities of each species discarded are not known exactly, being dependent upon the ratio of discards to landed fish in a sample of the catch. In comparison, the landed catch is known accurately.

Otoliths were collected from samples of plaice taken throughout the period of trawling, and from almost all cod sampled, and the ages of the fish were determined at CEFAS. An age-length-key (ALK) was constructed for plaice, giving the proportion of fish at each age in each length class. The ALK was applied to the mean length frequencies for landed and discarded plaice to give numbers of fish by age class.

Objective 1: To examine the effect on catches of using 80mm and 110mm cod-ends in the eastern Irish Sea plaice fishery.

The mean number of discards and retained plaice, sole, and whiting per length group, per hour fished, was computed over all the hauls for each cod-end mesh-size. The age-length key for all plaice collected during the trip was applied to the mean length frequency of plaice for the 80mm and 110mm nets, to give numbers of fish landed and discarded per hour, by age class. A comparison was then made between the catch rates by length and age for the two cod-end mesh sizes.

Objective 2: To investigate the by-catch of cod in the eastern Irish Sea plaice fishery

The catch rate of cod (numbers per hour) was recorded for all hauls. Otoliths were also collected in order to age the fish.

Results

The position, date, and time of the hauls made on FV *Kiroan*, along with numbers of the four principal commercial fish species caught in each haul, are shown in the table in Appendix 1. The catch data presented in tables elsewhere in this report are standardised to numbers per hour of trawling. The locations of all fishing stations (midway between shooting and hauling positions) are shown in Figure 1

Objective 1: To examine the effect on catches of using 80mm and 110mm cod-ends in the eastern Irish Sea plaice fishery.

Plaice: Many more plaice were discarded and retained for landing from catches using 80 mm cod-ends than when using the 110 mm cod-ends (Fig. 2). The 80mm nets caught about 4.5 times more plaice below 27cm than the 110mm nets (Fig. 2, bottom panel). The difference in catch rates declined with increasing size of plaice, falling below 20% by around 35cm. The larger average catch-rate of plaice over 39cm in the 110mm nets compared with the 80mm nets was due to relatively more of the tows containing plaice of this size (55% compared with 19% of the tows using 80mm mesh). This may reflect a patchier distribution of large plaice rather than a difference in trawl efficiency. In tows where plaice in this length range were caught, the mean catch per hour was similar in the two nets.

The average numbers of fish discarded per hour fished (all lengths) were 729 and 160 respectively (ratio of 4.6 : 1). Average numbers retained for landing per hour fished were 294 and 173 respectively (ratio 1.7 : 1). Expressed in terms of weight, the 80mm cod-end resulted in approximately 60% greater landings of plaice per hour fished than recorded for the 110mm net, at the expense of a large number of discarded plaice below MLS. .

The bulk of the discarded plaice were 2 and 3 year-olds (Fig. 3). The main factor influencing discard practices appeared to be the minimum landing size (27cm) (Fig. 2).

Sole: Very low numbers of sole (average of 0.2 fish per hour) were retained for landing from the catches of both mesh sizes (Fig. 4). There were no discards of sole using 110 mm mesh. Two hauls using the 80mm net had small numbers of sole of 11cm and 19cm in the catch

sample, and these had large raising factors resulting in discarding appearing to have occurred in only two length classes (Fig. 4). This result will be very imprecise.

Whiting: All whiting caught were discarded, including many fish above the minimum landing size of 27cm (Fig. 5). The mean catch rate was 97 fish per hour for the 80mm cod-end and 7 fish per hour for the 110mm cod-end (ratio of 13.9 : 1). The ratio of the average catch rates of the two mesh sizes showed no clear pattern with length of whiting (Fig. 5, bottom panel).

Objective 2: To investigate the by-catch of cod in the eastern Irish Sea plaice fishery

Cod were caught in very small numbers by both meshes. Only 10 out of the 64 hauls contained cod (Appendix 1 table). Nine of these hauls contained either one or two cod of 45 – 72 cm (all retained). An estimate of 72 fish of 13cm discarded from one haul using the 110 mm cod-ends was based on a record of a single fish found in the catch sample. The sample represented 1/72 of the total catch and hence had a raising factor of 72. This estimate of discards should therefore be regarded as highly imprecise. The average number of cod retained for landing was 0.1 fish per hour for the 80 mm nets, and 0.03 fish per hour for the 110 mm nets. The lengths ranged between 45 and 71 cm in the 80 mm cod-end, and between 45 and 72 cm in the 110 mm cod-end. The otoliths collected from these cod indicated that cod between 45 and 46 cm were 1 year-olds (4 fish), those between 57 and 67 cm were 2 years old (3 fish), and those between 71 and 72 cm were 3 years old (3 fish).

By-catch of other species

Very few commercially important species of fish were caught other than those already mentioned. However, non-commercial by-catch species were caught in large numbers. Figure 6 compares the catch rates with 80 and 110 mm mesh cod-ends. Catch rates for all species except bib and red gurnard (both of which were caught in very small numbers) were substantially higher with the 80mm cod-ends

Discussion and Recommendations

A reasonable experimental design was achieved during this FSP programme. Tows were evenly spread across an area of plaice fishing grounds off Morecambe Bay, and the 80mm and 110mm cod-ends were regularly swapped throughout the fishing period. Although catch rates will have been affected by factors such as variable presence of fish, weather, tide, time of day and location, these will have been fairly well balanced across the 64 tows. The results are therefore likely to represent what would be observed in the fleet under normal fishing conditions and using commercial twin-rig fishing gear in this area at this time of year.

Substantially more plaice (nearly 5 times as much) and whiting (nearly 14 times as much) were discarded per hour of trawling with 80 mm mesh cod-ends than with 110 mm cod-ends. The benefits of the 110mm cod-ends for reducing discards of plaice were obtained at the cost of a reduction in landings of plaice in the length range 27 – 38cm. It is anticipated that short-term losses of this nature would be countered by longer-term gains due to the growth in weight of escaping fish before they are recaptured and retained at a larger size in the future.

Catch rates of sole were low because the *Kiroan* was not targeting sole. Catch rates of cod were also very low. The use of 110 mm mesh not only reduced discards of commercial

species, but also greatly reduced the catch-rates of several non-commercial species caught and subsequently discarded.

The age compositions of plaice landed by FV *Kiroan* during the FSP trips in autumn 2004 show a greater contribution from 3-year-olds and a reduced contribution from ages 5 – 7 than observed in the total international landings for VIIa in 2001 – 2003 and given by the ICES forecast of landings of plaice in 2004 (Table 2). This may reflect the timing of the FSP trips, which may have experienced a lower availability of large mature plaice than during the spawning period in spring.

This FSP programme successfully achieved its first goal of demonstrating how a change in cod-end mesh size from 80mm to 110mm would affect the catch rates and discard rates of target species, particularly plaice.

The second objective, to demonstrate the by-catch of cod in the plaice fishery, could only be partially addressed because of the restricted time-period when fishing took place. The UK cod catch in the two ICES rectangles off Morecambe Bay varies seasonally, with highest catches in spring when adult cod are on the spawning grounds, and again in late autumn and early winter when the fishery tends to catch predominantly younger cod. Only ten cod of 1 – 3 years old were caught during the 64 tows in the present FSP programme. Catch-rates of 1-year-old and 2-year-old cod are however expected to be poor in autumn 2004, as the 2002 and 2003 year-classes of cod are estimated by ICES to be very weak (ICES ACFM report: October 2004 meeting). The 2001 year-class was much stronger. In the absence of by-catch data from other times of year, or from other fleets and areas in the Irish Sea, it is difficult to evaluate the significance of the low by-catch of cod in the FSP hauls. It is recommended that any evaluation of the “linkage” between plaice and cod in the different fisheries of the Irish Sea should be based on accurate catch composition data for all relevant fleets throughout the year, and adequate sampling of the landings and discards of these fleets to determine size and age compositions.

Table 2. Comparison between the percentage age compositions of landings of plaice during the FSP trips in autumn 2004 with the equivalent figures for the total international landings in 2001 – 2003 from the Irish Sea (VIIa) and the ICES forecast of landings in 2004 (ICES, 2005).

age	Landings 2001	Landings 2002	Landings 2003	FSP 80mm	FSP110mm	ICES forecast for 2004
2	6.9	9.1	4.6	2.3	2.1	4.2
3	24.4	27.7	20.9	41.1	37.9	18.0
4	31.0	26.3	33.0	31.1	32.8	36.5
5	16.6	18.6	18.7	13.7	14.1	20.4
6	9.8	9.9	12.0	5.1	6.2	10.5
7	6.0	4.3	7.1	3.6	3.5	5.3
8	3.0	2.2	2.1	2.1	2.3	2.4
9+	2.3	1.7	1.7	1.0	1.3	2.7

Acknowledgements

The authors wish to acknowledge the help of the NFFO and the skipper, Phil Dell, of FV *Kiroan* during these studies, as well as CEFAS colleagues involved in the entry of data and preparation and reading of otoliths.

References

ICES. 2005. Report of the Working Group on the Assessment of Northern Shelf Demersal Stocks. ICES CM 2005/ACFM:01.

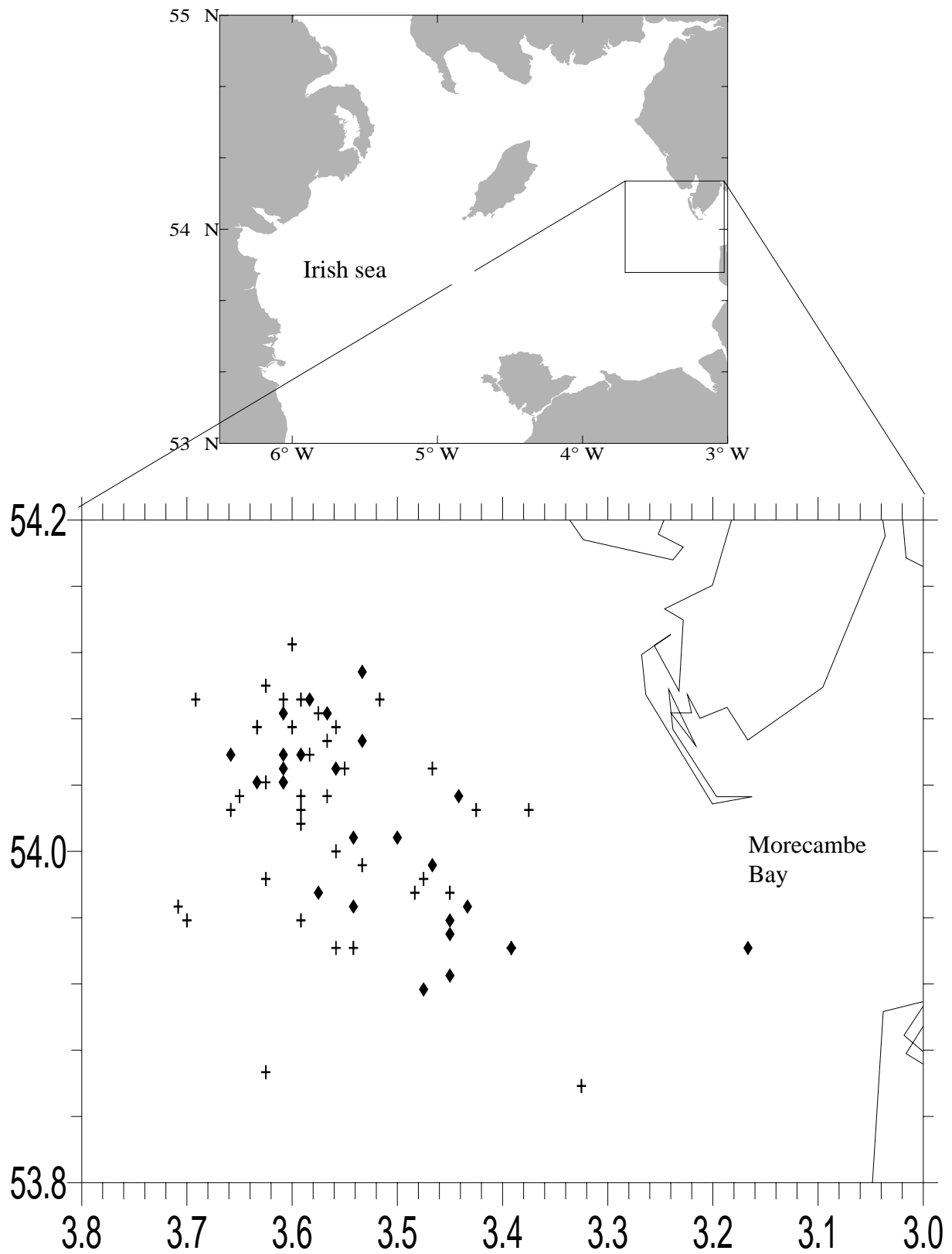


Fig. 1. Locations of tows carried out by FV Kiroan during FSP programme 8 (Irish Sea gear selectivity). Diamonds indicate hauls using 80mm codends, pluses hauls using 110mm cod ends.

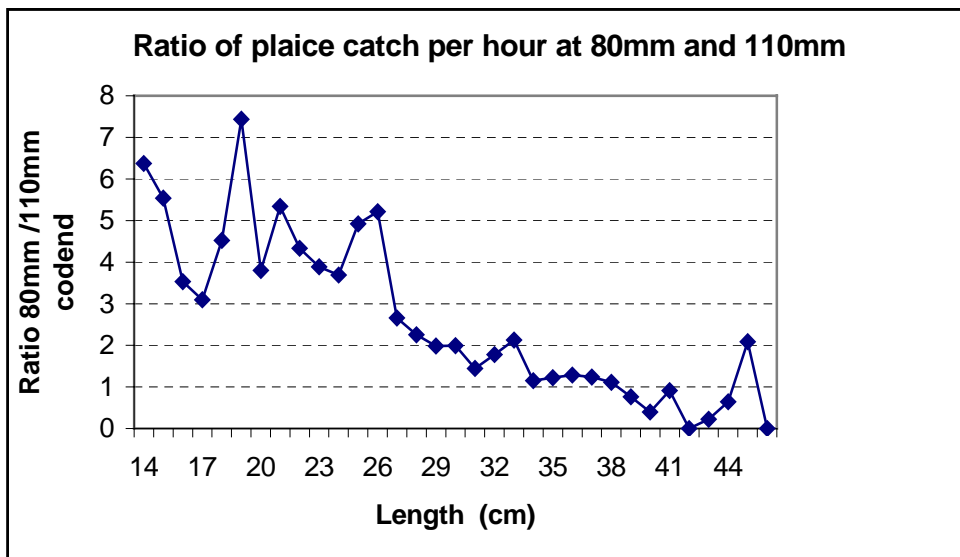
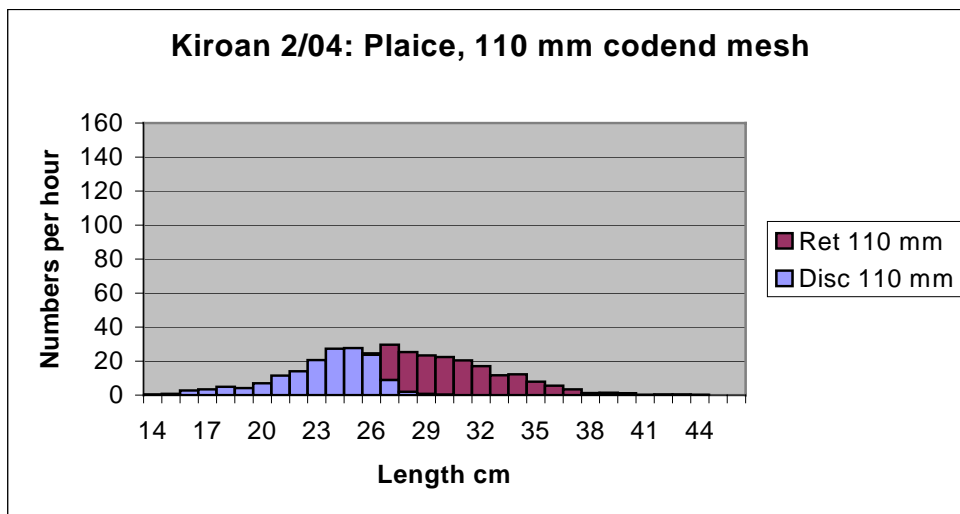
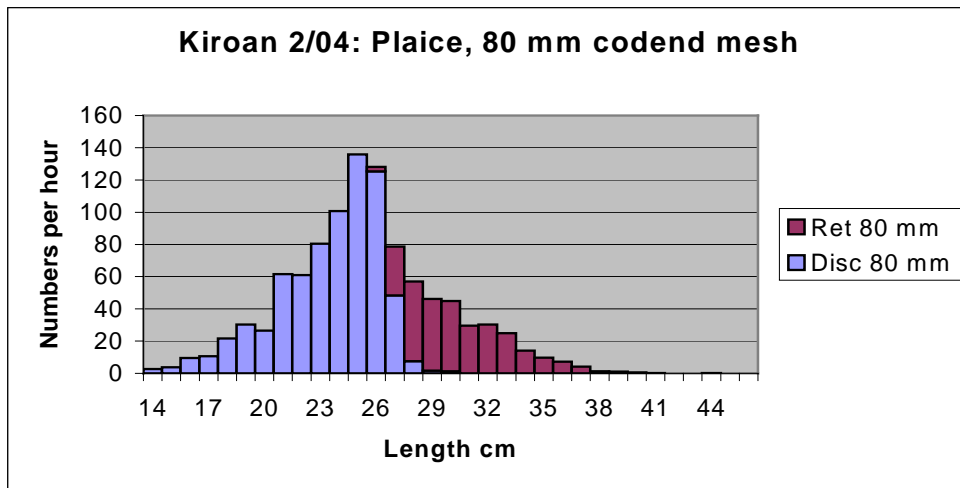


Fig. 2. Comparison of length frequency distributions for discarded and retained plaice obtained with 80 and 110 mm cod-end mesh during FV *Kiroan* FSP trips in autumn 2004. Bottom panel shows the ratio of the average catch rate in the 80mm cod-ends to the average in the 110mm cod-ends, by length class of plaice.

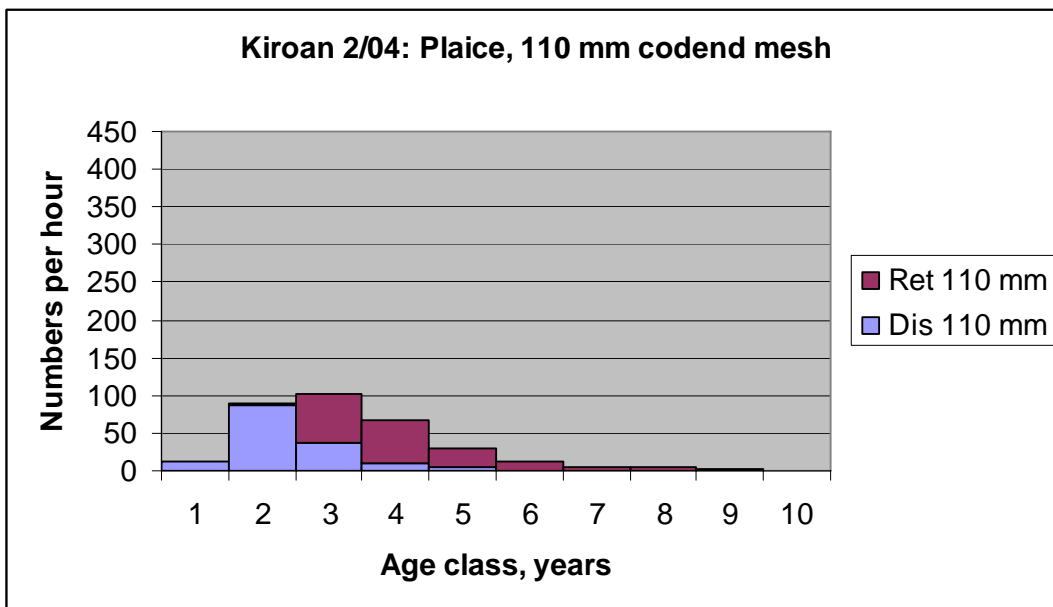
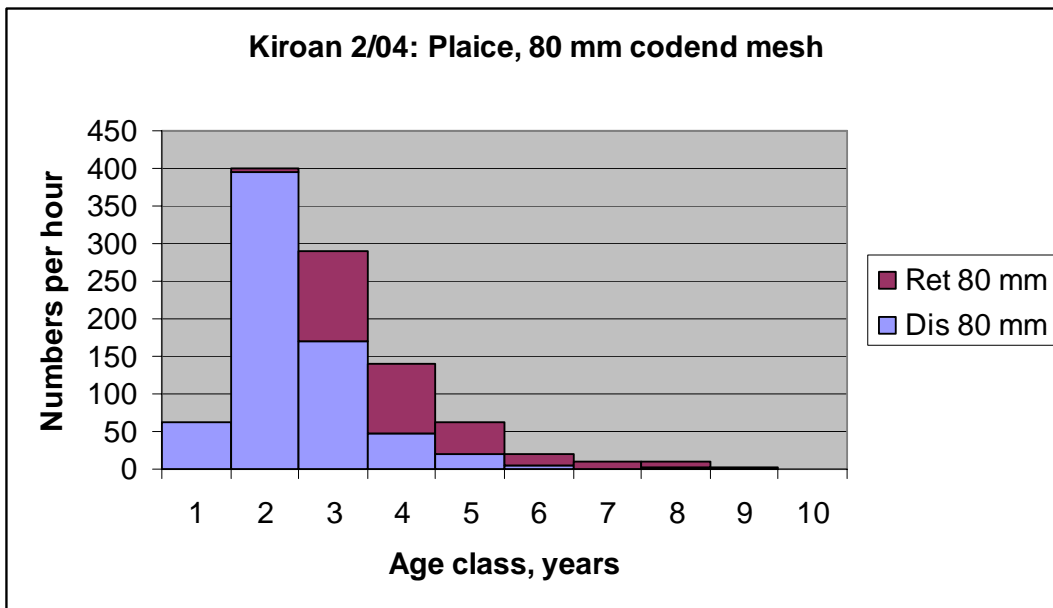


Fig. 3. Comparison of plaice age frequency distributions for discarded and retained plaice obtained with 80 and 110 mm cod-end mesh during FV *Kiroan* FSP trips in autumn 2004.

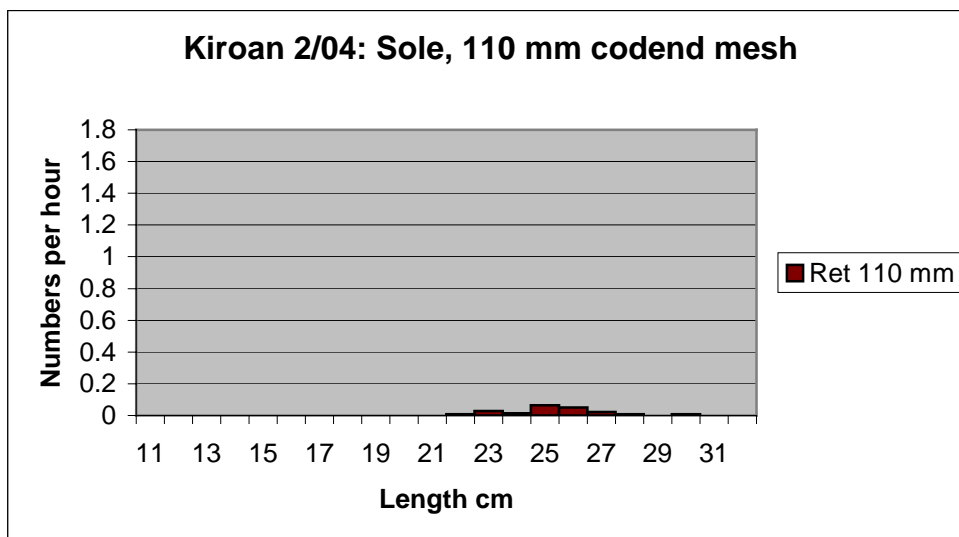
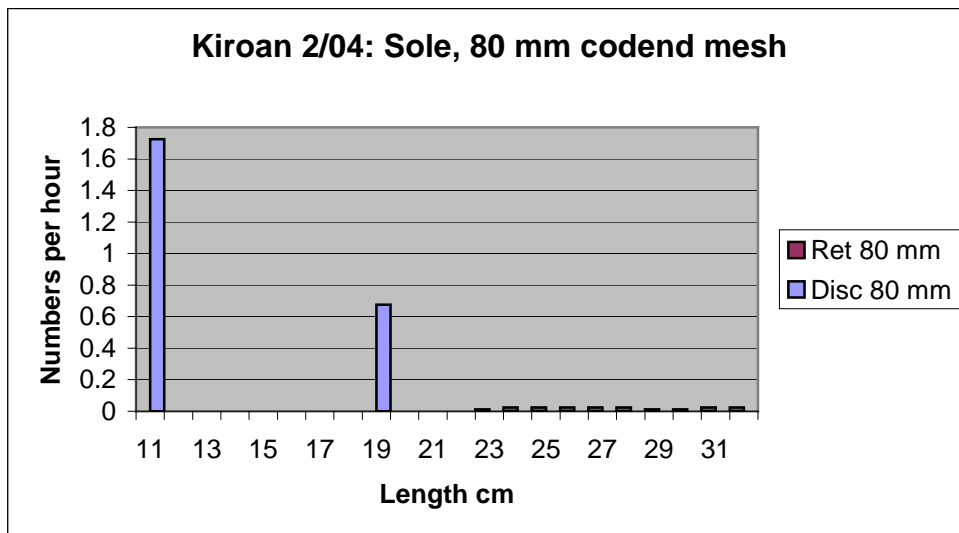


Fig. 4. Comparison of length frequency distributions for discarded and retained sole obtained with 80 and 110 mm cod-end mesh during FV *Kiroan* FSP trips in autumn 2004.

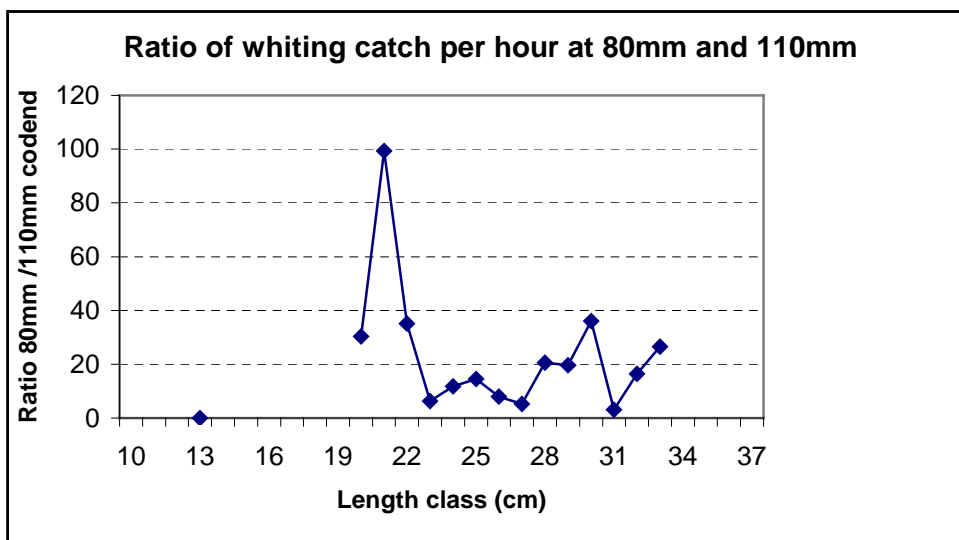
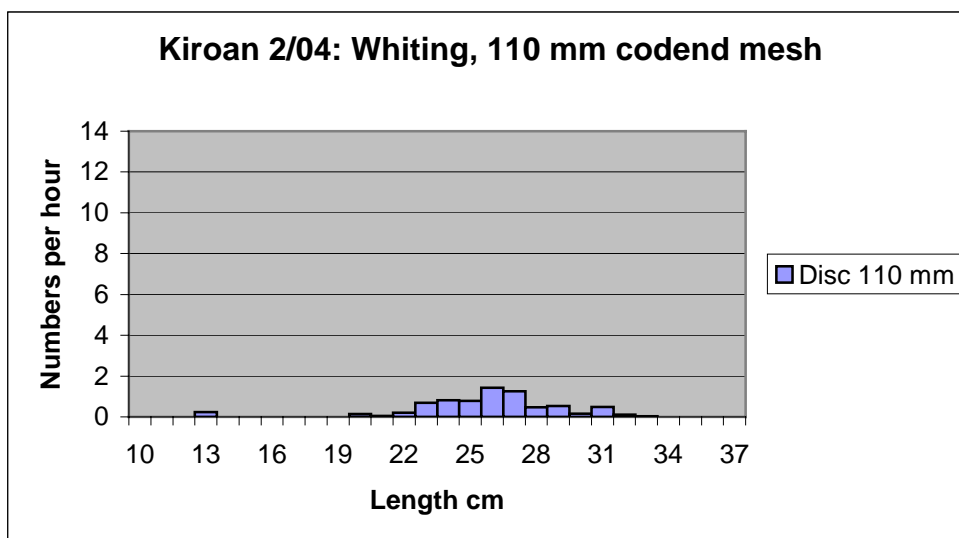
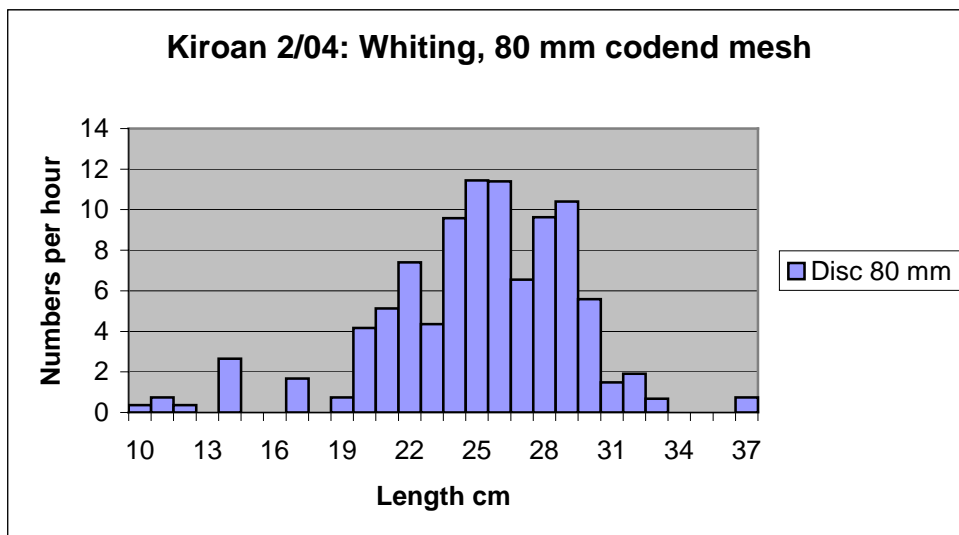


Fig. 5. Comparison of length frequency distributions for discarded and retained whiting obtained with 80 and 110 mm cod-end mesh during FV *Kiroan* FSP trips in autumn 2004. Bottom panel shows the ratio of the average catch rate in the 80mm cod-ends to the average in the 110mm cod-ends, by length class of whiting.

Kiroan 2/04: By-catch species

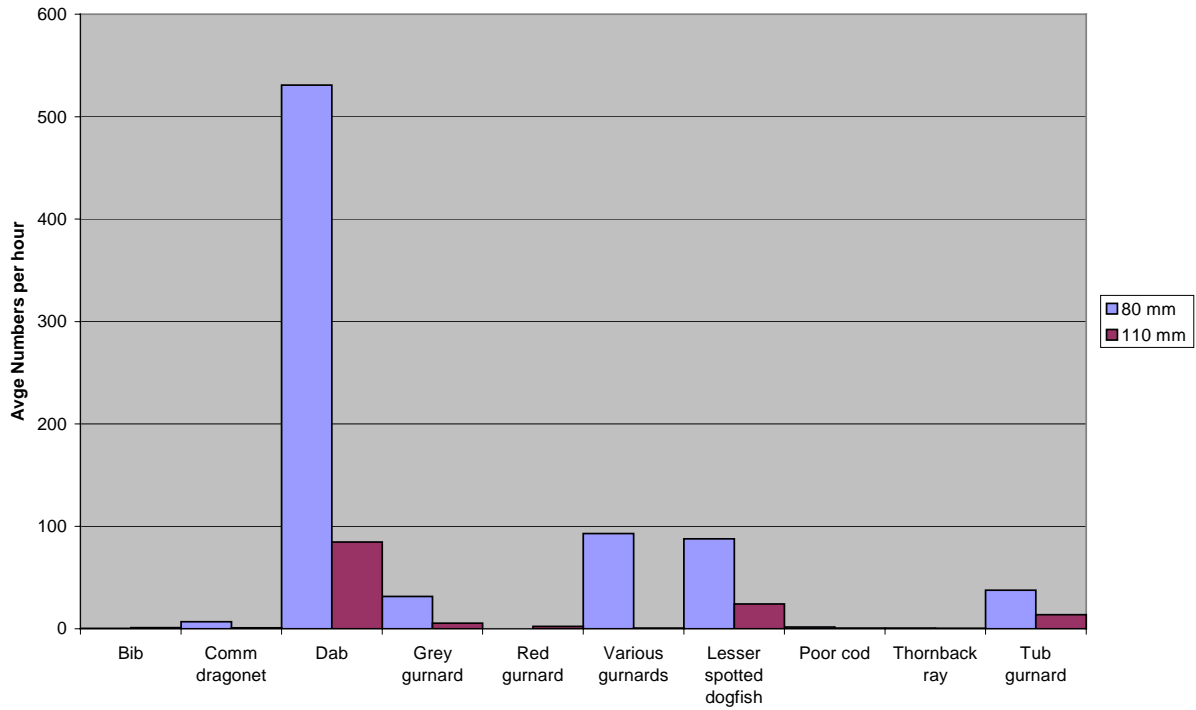


Fig. 6. Comparison of average catch rates of by-catch species with 80 and 110 mm cod-end mesh during FV *Kiroan* FSP trips in autumn 2004.

Appendix 1: FSP Programme 8: Gear selectivity in the Irish Sea (FV *Kiroan*, autumn 2004). Station and catch (in numbers) details for four species of fish (COD = cod; WHG=whiting, PLE=plaice, SOL=sole).

Stn	Gear type	Mesh mm	Shot Lon	Shot Lat	Haul Lon	Haul Lat	Date shot	Time shot	Tow hrs	COD_N	WHG_N	PLE_N	SOL_N
1	Twin rig trawl	110	-3.33	53.95	-3.63	54.00	09-Sep-04	9:30	4.00	0	0	486	0
2	Twin rig trawl	110	-3.63	54.00	-3.62	53.97	09-Sep-04	14:00	4.00	0	12	818	0
3	Twin rig trawl	110	-3.62	53.97	-3.57	53.95	09-Sep-04	18:30	4.50	0	12	647	0
4	Twin rig trawl	110	-3.57	53.95	-3.55	53.93	09-Sep-04	23:30	4.50	0	6	450	0
5	Twin rig trawl	110	-3.55	53.93	-3.53	53.95	10-Sep-04	4:30	4.50	0	8	460	0
6	Twin rig trawl	80	-3.55	53.95	-3.60	54.00	10-Sep-04	9:45	3.00	0	650	4896	0
7	Twin rig trawl	80	-3.60	54.00	-3.48	53.93	10-Sep-04	13:15	2.75	0	300	3710	0
8	Twin rig trawl	80	-3.48	53.93	-3.47	53.90	10-Sep-04	16:30	2.00	0	0	5870	0
9	Twin rig trawl	80	-3.28	53.93	-3.05	53.95	15-Sep-04	14:15	2.25	0	160	2630	40
10	Twin rig trawl	110	-3.50	53.95	-3.28	53.93	15-Sep-04	17:10	2.33	0	0	288	0
11	Twin rig trawl	80	-3.28	53.93	-3.50	53.95	15-Sep-04	20:00	2.50	0	30	566	0
12	Twin rig trawl	110	-3.43	53.95	-3.98	53.98	24-Sep-04	11:00	3.50	0	0	428	0
13	Twin rig trawl	110	-3.98	53.98	-3.42	53.93	24-Sep-04	15:00	4.50	0	0	356	0
14	Twin rig trawl	110	-3.42	53.93	-3.65	54.05	24-Sep-04	19:45	4.75	0	0	360	0
15	Twin rig trawl	110	-3.65	54.05	-3.67	54.00	25-Sep-04	1:15	4.25	0	0	330	0
16	Twin rig trawl	110	-3.67	53.98	-3.45	54.02	25-Sep-04	6:00	4.50	0	0	456	0
17	Twin rig trawl	110	-3.45	54.02	-3.68	54.05	25-Sep-04	11:00	4.50	0	0	346	0
18	Twin rig trawl	110	-3.68	54.05	-3.50	54.00	25-Sep-04	16:00	3.00	0	0	340	0
19	Twin rig trawl	110	-3.50	54.00	-3.68	54.07	25-Sep-04	19:30	5.00	0	0	328	0
20	Twin rig trawl	110	-3.68	54.07	-3.50	53.97	26-Sep-04	1:00	5.00	0	0	374	0
21	Twin rig trawl	110	-3.40	54.03	-3.45	54.02	28-Sep-04	3:00	4.00	0	0	241	0
22	Twin rig trawl	110	-3.45	54.02	-3.50	53.95	28-Sep-04	7:30	4.00	0	0	170	0
23	Twin rig trawl	80	-3.50	53.95	-3.37	53.98	28-Sep-04	12:00	2.00	0	120	504	0
24	Twin rig trawl	80	-3.37	53.98	-3.57	54.00	28-Sep-04	14:45	2.00	0	200	886	0
25	Twin rig trawl	80	-3.57	54.00	-3.70	54.08	28-Sep-04	17:15	2.25	0	270	2118	0
26	Twin rig trawl	110	-3.70	54.08	-3.60	53.98	28-Sep-04	20:15	4.25	0	0	254	0
27	Twin rig trawl	110	-3.60	53.93	-3.65	53.80	29-Sep-04	1:00	4.00	0	4	282	0
28	Twin rig trawl	110	-3.65	54.05	-3.60	54.03	29-Sep-04	7:45	4.00	0	4	1590	0
29	Twin rig trawl	80	-3.60	54.03	-3.62	54.05	29-Sep-04	12:25	2.08	0	160	3364	0

Appendix 1 cont.

Stn	Gear type	Mesh mm	Shot Lon	Shot Lat	Haul Lon	Haul Lat	Date shot	Time shot	Tow hrs	COD_N	WHG_N	PLE_N	SOL_N
30	Twin rig trawl	80	-3.62	54.05	-3.57	54.07	29-Sep-04	15:00	2.00	0	200	3680	0
31	Twin rig trawl	80	-3.57	54.07	-3.65	54.05	29-Sep-04	17:30	2.25	0	204	2716	102
32	Twin rig trawl	110	-3.65	54.05	-3.55	54.10	29-Sep-04	20:30	4.50	0	0	776	0
33	Twin rig trawl	110	-3.55	54.10	-3.57	54.05	30-Sep-04	1:30	4.25	0	2	500	0
34	Twin rig trawl	80	-3.57	54.05	-3.65	54.03	30-Sep-04	6:15	4.25	0	164	2792	0
35	Twin rig trawl	80	-3.65	54.03	-3.57	54.07	30-Sep-04	11:00	3.00	0	0	3540	0
36	Twin rig trawl	80	-3.57	54.07	-3.55	54.03	30-Sep-04	14:30	3.50	0	222	4396	0
37	Twin rig trawl	80	-3.55	54.03	-3.53	53.98	30-Sep-04	18:30	2.50	0	222	2868	0
38	Twin rig trawl	80	-3.47	54.07	-3.60	54.07	07-Oct-04	10:00	3.00	1	172	6095.52	17
39	Twin rig trawl	80	-3.60	54.07	-3.53	54.10	07-Oct-04	14:10	2.08	0	48	4524	0
40	Twin rig trawl	110	-3.53	54.10	-3.60	54.03	07-Oct-04	17:00	4.00	0	0	4548	0
41	Twin rig trawl	110	-3.60	54.03	-3.57	54.08	07-Oct-04	21:30	4.00	0	16	1900	0
42	Twin rig trawl	110	-3.57	54.08	-3.62	54.10	08-Oct-04	2:00	4.00	0	0	1965	0
43	Twin rig trawl	110	-3.62	54.10	-3.65	54.05	08-Oct-04	6:30	3.75	0	14.5	1994	0
44	Twin rig trawl	80	-3.65	54.05	-3.67	54.07	08-Oct-04	10:45	3.75	1	60	902	0
45	Twin rig trawl	80	-3.67	54.07	-3.55	54.10	08-Oct-04	15:00	3.25	1	154	1494	0
46	Twin rig trawl	80	-3.55	54.10	-3.52	54.12	08-Oct-04	18:45	3.50	0	72	1444.26	0
47	Twin rig trawl	110	-3.52	54.13	-3.68	54.12	08-Oct-04	22:45	4.00	1	18	1593	28
48	Twin rig trawl	110	-3.68	54.12	-3.70	54.07	09-Oct-04	3:30	4.00	0	0	2899.26	0
49	Twin rig trawl	110	-3.70	54.07	-3.52	54.12	09-Oct-04	8:00	4.00	0	20	2541	0
50	Twin rig trawl	80	-3.52	54.12	-3.65	54.07	09-Oct-04	12:30	4.00	0	72	2559	0
51	Twin rig trawl	110	-3.65	54.07	-3.62	54.08	09-Oct-04	17:00	4.25	1	7	1380	0
52	Twin rig trawl	110	-3.62	54.08	-3.63	54.12	09-Oct-04	21:45	4.25	0	0	936	0
53	Twin rig trawl	110	-3.63	54.12	-3.52	54.05	10-Oct-04	2:45	4.25	0	0	558	0
54	Twin rig trawl	80	-3.52	54.05	-3.37	54.02	10-Oct-04	7:45	3.75	0	0	1158	0
55	Twin rig trawl	110	-3.37	54.02	-3.38	54.03	10-Oct-04	12:15	5.00	2	0	228	0
56	Twin rig trawl	80	-3.35	53.95	-3.55	53.95	11-Oct-04	12:10	2.33	1	576	2464	0
57	Twin rig trawl	80	-3.55	53.95	-3.35	53.97	11-Oct-04	15:00	2.50	2	1408	1360	0
58	Twin rig trawl	110	-3.35	53.97	-3.55	53.98	11-Oct-04	18:00	2.75	0	96	276	0
59	Twin rig trawl	110	-3.55	53.98	-3.55	54.12	11-Oct-04	21:15	3.75	1	98	1798.96	0
60	Twin rig trawl	110	-3.55	54.12	-3.48	54.07	12-Oct-04	1:30	4.00	0	162	2712	0

Appendix 1 cont.

Stn	Gear type	Mesh mm	Shot Lon	Shot Lat	Haul Lon	Haul Lat	Date shot	Time shot	Tow hrs	COD_N	WHG_N	PLE_N	SOL_N
61	Twin rig trawl	110	-3.48	54.07	-3.45	54.03	12-Oct-04	6:00	4.00	0	164	3247	0
62	Twin rig trawl	80	-3.45	54.03	-3.55	53.98	12-Oct-04	10:30	3.00	0	690	1572	0
63	Twin rig trawl	80	-3.55	53.98	-3.35	53.87	12-Oct-04	14:00	2.50	0	352	942	0
64	Twin rig trawl	110	-3.35	53.85	-3.30	53.87	12-Oct-04	17:00	2.00	72	216	5896	0

Appendix 2

CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE, LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK NR33 OHT

REPORT: Kiroan FSP Programme 8 (Irish Sea Gear Selectivity)

STAFF: Jennie Keable, Peter White, Tom Woods (CEFAS)

DURATION: 9th September - 12th October 04

LOCATION: Fleetwood

Aims:

- To assess discard rates of flatfish using 80mm and 110mm mesh cod ends on commercial demersal twin rig trawl.
- Obtain lengths and otoliths from target species plaice and cod over the length range sufficient for an overall ALK.

Narrative:

(1) Jennie Keable (9th – 10th September)

Kiroan sailed from Fleetwood at 0700 on Thursday 9th September. We proceeded to North Rig area, where we completed 5 tows using 110mm cod end, fishing through the night. On the morning of Friday 10th September the cod end was changed to 80mm mesh and we completed a further 3 tows before returning to Fleetwood at 2130 due to worsening weather.

(2) Peter White (15th September to 16th September)

The CEFAS sampling officer left Weymouth on 14th September to travel to Fleetwood to begin the fishing survey on the Kiroan the following day. On the 15th September the Kiroan departed from Fleetwood on the afternoon tide. The crew consisted of the Skipper (Mr Phil Dell) plus three other crewmembers. After a short steam, fishing commenced. The vessel settled into a fishing pattern detailed in the data sheets. Kiroan returned to Fleetwood at 02:00 on the 16th September due to bad weather and was unable to sail again for a number of days.

(3) Peter White (24th September to 1st October)

The CEFAS sampling officer left Weymouth on 23th September to travel to Fleetwood to begin the fishing survey on the Kiroan the following day. On the 24th September the Kiroan departed from Fleetwood on the afternoon tide due to engine problems in the morning. The crew consisted of the Skipper (Mr Phil Dell) plus four other

crewmembers. After a short steam, fishing commenced. The vessel settled into a fishing pattern detailed in the data sheets. Kiroan returned to Fleetwood at 09:00 on the 26th September due to bad weather and was unable to sail again until 11:00 on the 27th September and after a short steam continued fishing. The Kiroan returned to Fleetwood on the 1st October 0:30.

(4) Tom Woods (7th – 12th October)

The CEFAS sampling officer left Lowestoft on 3rd October to travel to Fleetwood with the intention to begin the fishing survey the following day. However, due to bad weather, fishing was delayed until the morning of the 7th October when “Kiroan” set sail at 05:30 hours (local time) from Fleetwood. The crew consisted of the Skipper (Mr Phil Dell) plus three other crew members. After a four hour steam fishing commenced. The vessel settled into a fishing pattern of six hauls over a 24-hour period. After completing 18 hauls Kiroan returned to Fleetwood on the 10th October to unload and refuel. Kiroan sailed again the following morning and proceeded to complete another 9 hauls before finally returning to port on the 12th October.

Gear:

The gear comprised of twin rig bottom trawls of 80mm and 110mm mesh. Comparative tows using each mesh size were undertaken during the duration of the survey. Both cod-ends were winched straight into a hopper and a conveyor belt transferred the catch to the sorting table where all four members of crew proceeded to process the catch, which took up to 3hrs to complete. No changes were made to the gear throughout the trip, other than changing mesh sizes, and no damage occurred.

Results:

A total of 64 hauls were completed, none of which were invalid. For each haul quantities of all retained finfish were recorded and subsamples of target species measured. Where time permitted one basket of discards was measured, a minimum of half a basket was measured if pushed for time. The total quantity of discards was estimated by determining the volume of discards equivalent to one basket of retained. By knowing the total quantity of retained at the end of each haul an estimate of total quantity of discards could be made.

J.Keable, P.White, T Woods

16th November 2004