

R1/12

IN CONFIDENCE - NOT TO BE QUOTED WITHOUT REFERENCE TO THE LABORATORY

FRV SCOTIA

3SR82

CRUISE 3/82

REPORT:

17 March - 6 April 1982

OBJECTIVES

1. To conduct an acoustic survey of the blue whiting stocks west of the British Isles by means of echo-integration and trawl sampling.
2. To obtain single fish echo data using a dual beam transducer for the estimation of the in situ target strength of blue whiting.
3. To collect samples of sea water and deep-water fish other than blue whiting, in particular Gonostomatidae.

NARRATIVE

"Scotia" sailed from Aberdeen at 1530 on 17 March. Water samples for the radio-caesium monitoring programme were collected at three stations on the passage to the West Coast. On the morning of 18 March the ship anchored in Loch Eriboll where the EK38S echo-sounder was calibrated. The acoustic survey began that evening and work continued until late on 24 March, except for a brief interruption of two hours on 20 March on account of severe weather. The cruise track is shown on the attached chart. The ship arrived in Stornoway at 0900 on 25 March for the mid-cruise landing.

Having left Stornoway at 1100 on 26 March, a second echo-sounder calibration was performed in Broad Bay before resuming the survey. The weather was excellent for the time of year and the work continued without interruption, except for six hours on 29 March and two hours on 2 April, occasioned by severe gales. Radio contact was established with the Faroese research vessel "Magnus Heinason" on the morning of 2 April and that evening the two ships proceeded to a rendezvous west of the Shetlands. An inter-ship calibration of the acoustic survey equipment was performed while the ships steamed in close formation along a 40 mile track. Thereafter, "Scotia" continued the survey independently, until 1700 on 4 April. A third acoustic calibration was performed in Dunnet Bay early on the morning of 5 April. "Scotia" then returned to Aberdeen where the cruise ended at 1530 on that day.

RESULTS

The echo-traces observed throughout the survey area could be classified for the most part as one of two groups. First there was an upper scattering layer at 200-300m depth which gave a diffuse trace. This was identified by trawling as pearlsheds (Mauroliscus muelleri) and euphausiids. Secondly, there were deeper traces which began as a layer 10m or more thick, close to the seabed in 300-400m of water, extending off the continental shelf edge as a midwater layer which sometimes broke into more shoal-like marks, mostly found in the depth range 400-500m. The latter marks were identified again

by trawling, and in the case of midwater marks, the catches consisted almost entirely of blue whiting (Micromesistius potassou). However, one haul on a layer close to the seabed in 400m of water yielded a significant by-catch (20% by number) of Argentina silus. A small number of squid and jellyfish were taken occasionally. It was therefore assumed for the purposes of echo-integration, that the blue whiting were all below 250m and that other species made no significant contribution to the integrator readings below that depth, in accordance with previous practice and experience of the blue whiting distribution.

The blue whiting traces were widespread along the edge of the continental shelf over the whole area surveyed, from 52°30'N to 60°30'N, but they were patchy and the very dense kind of layer covering a large horizontal area, such as was often observed on previous surveys, was not seen on the present cruise. Particular concentrations were found on the shelf edge around 54°N and 59°N where the integrator recordings indicated fish densities up to 150 tonnes/km². The results are being analysed to produce the total biomass estimate for the surveyed area which will be reported later.

Twelve trawl hauls were made each of about one hour duration and at a towing speed of 2.5-3 knots, one on the upper scattering layer for identification purposes and the remainder on marks below 250m. Of the latter, three hauls obtained only a few pearlides or euphausiids which may well have been taken as the net sank or rose through the upper scattering layer. The other eight hauls resulted in low catches of blue whiting. A preliminary analysis of the results is shown in Table 1. There was much variation in the sex composition of the catches. The maturity states showed a consistent trend with the proportion of pre-spawners decreasing with time and increasing with latitude.

TABLE 1 Analysis of blue whiting catches. M = males, F = females

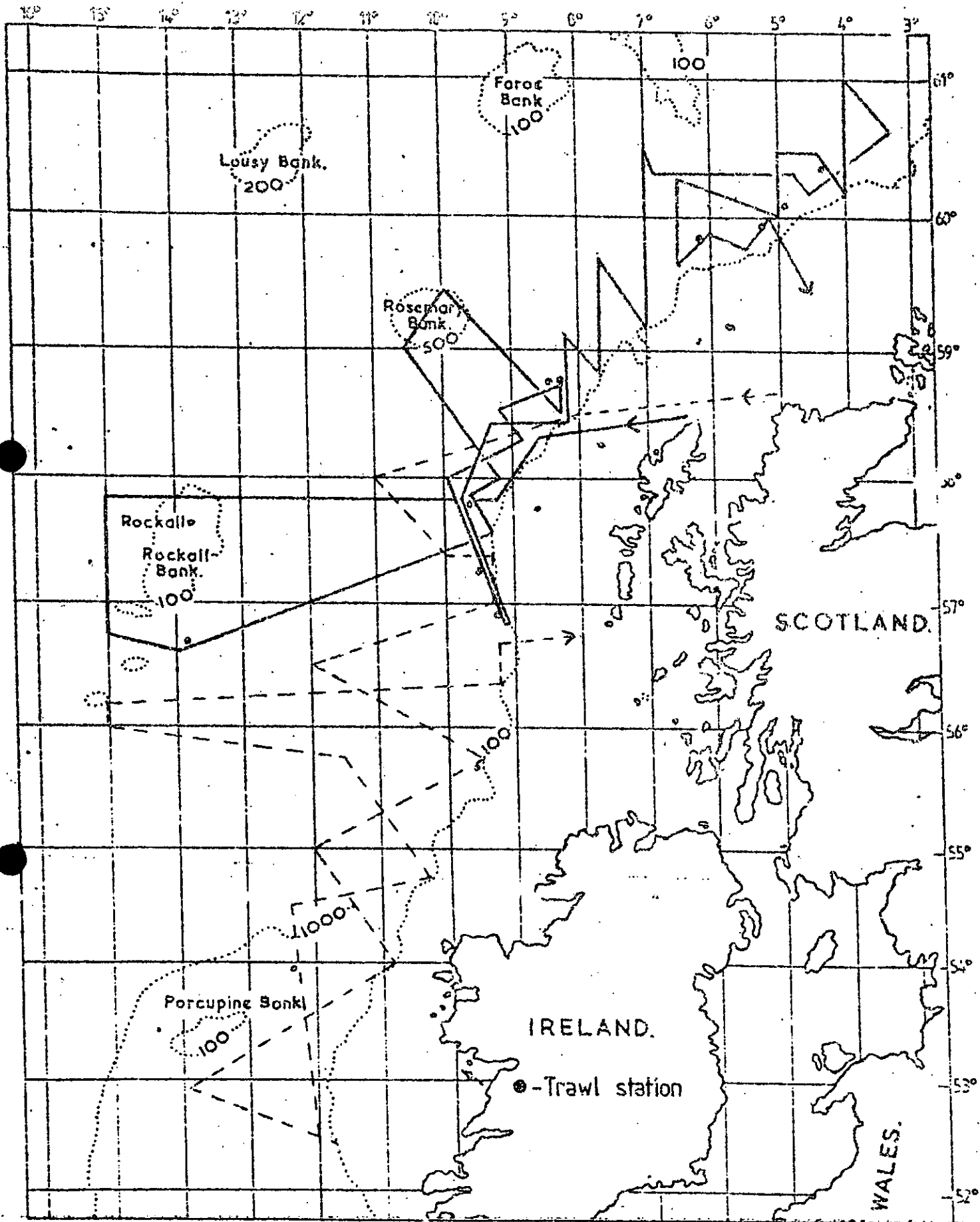
Haul No. S82/	Date	Position	Catch (baskets)	Composition (% by number)	Mean Length (cm)	State of Maturity
35	20.3	55°39'N 09°23'W	1	(M) 69 (F) 31	27.0 28.7	pre-spawning
36	22.3	53°58'N 12°18'W	6	(M) 39 (F) 61	28.0 31.0	90% spent 90% spent
40	30.3	58°38'N 08°22'W	0.5	(M) 60 (F) 40	29.7 32.2	pre-spawning
41	31.3	57°14'N 09°21'W	0.5	(M) 30 (F) 70	24.8 28.1	28% spent 38% spent
42	31.3	56°53'N 09°10'W	0.5	(M) 35 (F) 65	26.3 29.4	41% spent 54% spent
43	3.4	60°21'N 04°18'W	0.5	(M) 51 (F) 49	29.8 32.1	pre-spawning
44	3.4	60°03'N 04°58'W	4	(M) 49 (F) 51	30.3 33.3	pre-spawning
46	4.4	60°03'N 04°53'W	5	(M) 47 (F) 53	29.3 31.7	pre-spawning

The largest catch rates were obtained on fish close to the seabed. Comparison of the netsonde and shipboard echo-sounder records suggested that when in midwater, the blue whiting were avoiding the net by diving.

The dual beam transducer was deployed once in an attempt to obtain an in situ measurement of the blue whiting target strength. Unfortunately, the receiver signals were obscured by electrical noise. Further tests to investigate this problem were prevented by a breakdown of the Elac winch. However, the in situ experiments are to be continued on Cruise 4/82.

D.N. MacLENNAN
25 May 1982

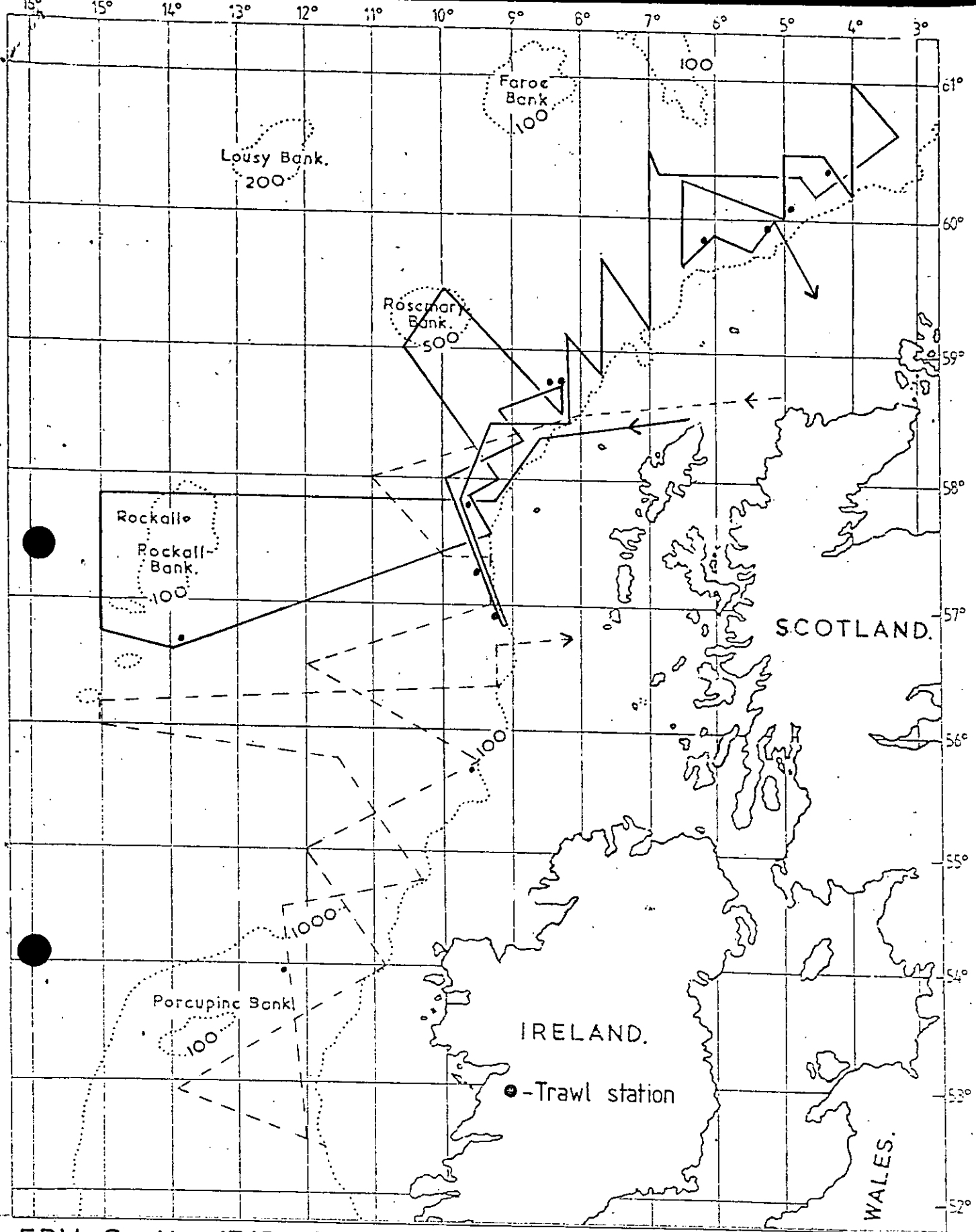
Seen in draft: J W Gillon



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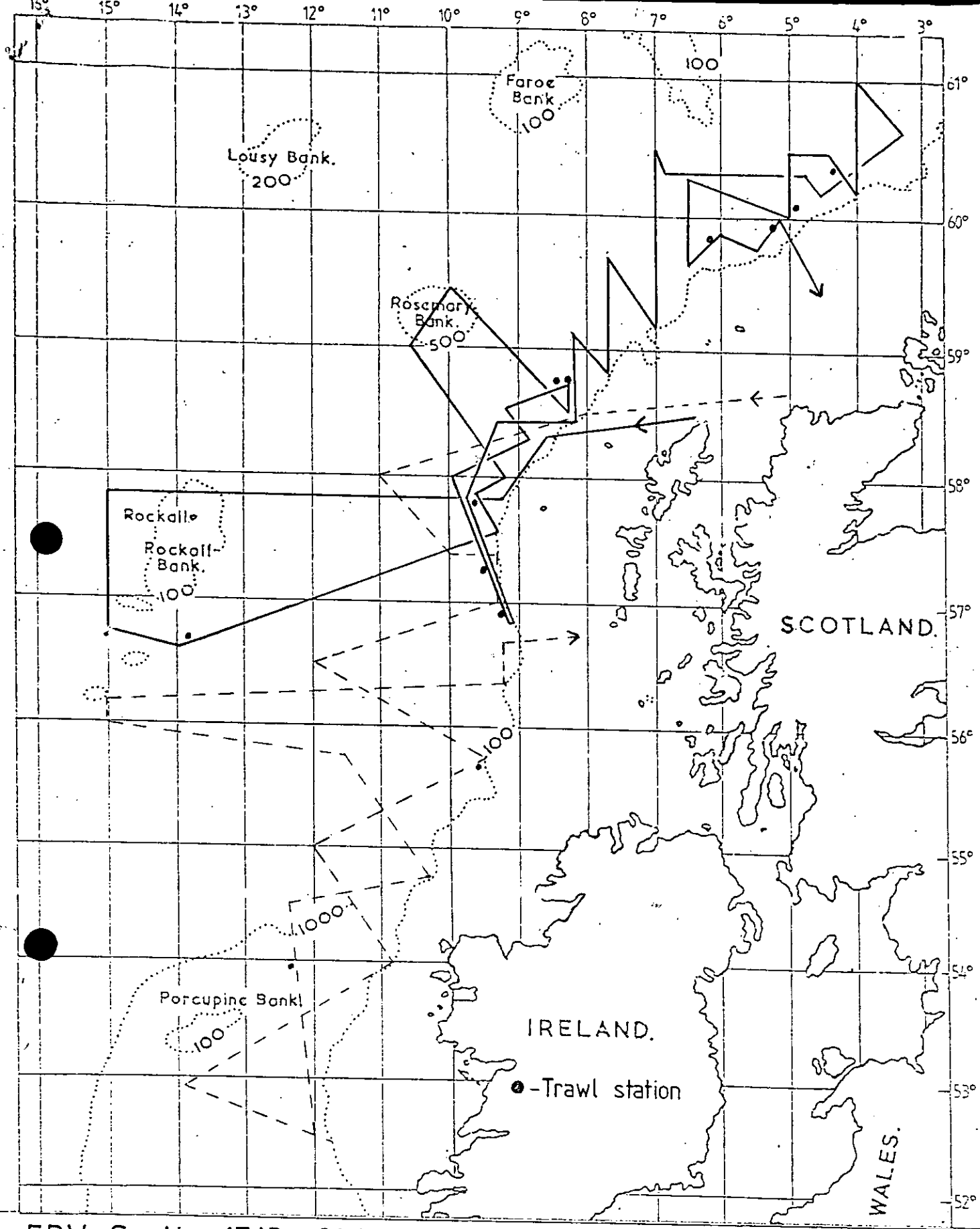
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