

R1/4

In Confidence - Not to be quoted without reference to the Laboratory

FRV EXPLORER

Cruise 1/81

REPORT

14 January - 3 February 1981

Objectives:

1. To carry out an echointegration survey for sprats in the Western North Sea between the Firth of Forth and Flamborough Head.
2. To identify echo traces using a pelagic trawl.

General

EXPLORER sailed from Leith at 2100 on the 14 January, the acoustic equipment was then calibrated whilst EXPLORER was at anchor in Largo Bay. The acoustic survey started at 0600 on the 15 December with a preliminary survey of the Firth of Forth. Strong northerly winds and swell prevented the EXPLORER from steaming the East-West grid and an equivalent North-South grid was improvised. The survey grid was completed in a southerly direction and a detailed survey of sprat concentrations close to the coast was executed. The survey grid was worked to the North terminating off Aberdeen for the half landing at 2000 on 25 January.

EXPLORER sailed at 1400 on the 27 January and a survey grid was worked North into the Moray Firth, a detailed survey being made of the fish concentrations between Nairn and Inverness and the fish concentration North of Troup Head.

The planned survey grid was completed at 0900 on the 1 February and the remaining period was used to resurvey the fish concentration in the Firth of Forth and off Montrose. The survey ended at 22.00 on the 2 January 1981.

Results

The survey grid for the first and second half of the cruise are attached. 14 samples were taken with the midwater trawl PT112, the position of these hauls is shown on the cruise track.

The overall distribution of sprats is somewhat more complicated than in previous years with a larger proportion of herring present. Few sprats were located in the western Moray Firth (Nairn to Inverness) where there did seem to be a population of small herring, modal length 13cm. The concentration of fish north of Troup Head appeared to be almost pure sprats modal length 8cm. The concentration between the river Tay and Montrose proved to be a mixture of sprat and herring. On the first part of the survey they were located within 5 miles of the shore whilst on the second survey, approximately 1 week later, the population had spread further offshore and concentrations were generally less dense.

The trawl haul in the outer Firth of Forth contained a significant proportion of herring whilst a trial sample taken 1 week later in the Firth was almost pure sprats with very few herring present.

Small fish populations were located in the Tyne-Tees area, these appeared to be a mixture of sprat and herring, the sprats tending to prefer the shallow inshore water. A very dense, but small, concentration of fish was located north of Flamborough Head. Unfortunately weather conditions prevented these fish from being sampled.

The echointegrators were set to measure the fish from 5 m below the transducer to 3 m above the seabed, except in heavy weather conditions when the upper limit was lowered to 10 m below the transducer to eliminate false readings due to abration.

The acoustic equipment was calibrated 3 times during the cruise and the best estimate of the conversion constant was 10.0 tonnes per km², assuming a target strength of -34 dB per kg for the fish under observation.

The results of the acoustic survey by half statistical square (30' x 30') are presented in the table.

J I Edwards
3 June 1981

Seen in draft. T Henderson

NORTHERN HALF OF SPRAT SURVEY

TS = 34 per kg

30' x 30' squares position at SW Coner		% Area of square used in estimate	% Biomass assumed to be sprats	Estimate in tons x 10 ³	Number of 2.5 miles samples N
Lat	Long				
56.00N	2.30W	100	80	8.8	95
"	2.00W	100	80	1.6	51
"	1.30W	100	80	2.4	13
"	3.30W	10	70	7.0	3
"	3.00W	45	70	5.1	64
56.30N	2.30W	75	90	24.9	144
"	2.00W	100	90	2.1	52
"	1.30W	100	90	19.4	11
57.00N	2.30W	10	90	1.8	4
"	2.00W	100	90	12.5	94
"	1.30W	100	90	0.7	35
"	1.00W	100	90	1.1	3
57.30N	2.30W	60	95	6.0	94
"	2.00W	80	90	1.8	47
"	1.30W	100	90	0.7	27
"	1.00W	100	90	297.2*	7
"	4.00W	50	55	6.7	38
"	3.30W	60	60	.7	30
"	3.00W	60	60	.4	29
58.00N	3.30W	65	55	.2	7
"	3.00W	65	55	.4	8
"	2.30W	100	55	.4	7
"	2.00W	100	55	.4	7

105.10 x 10³ tons

* This value (297.2) is probably spurious - one very large reading, it is not included in the estimate

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SOUTHERN PART

30' x 30' squares position at SW Coner		% Area of square used in estimate	% Biomass assumed to be sprats	Estimate in tons x 10 ³	Number of 2.5 miles samples N
Lat	Long				
54.00N	0.30W	50	90	14.5	51
54.30N	1.30W	40	40	0.9	33
"	1.00W	90	90	4.0	75
"	0.30W	100	80	2.5	30
55.0N	1.30W	95	60	9.2	63
55.0N	1.00W	100	60	1.1	28
"	0.30W	100	60	1.3	4
55.30N	2.00W	70	60	1.9	26
"	1.30W	100	60	1.5	39
"	1.00W	100	60	1.2	12

38.1 x 10³ tons

Total Estimate 143.2 x 10³

Note this is calculated for TS of -34 dB per kg
 If -29 dB per kg is used the estimate is reduced by 5 dB
 ie: a factor of 3.16

estimate at -29

= 45.28 x 10³ tons

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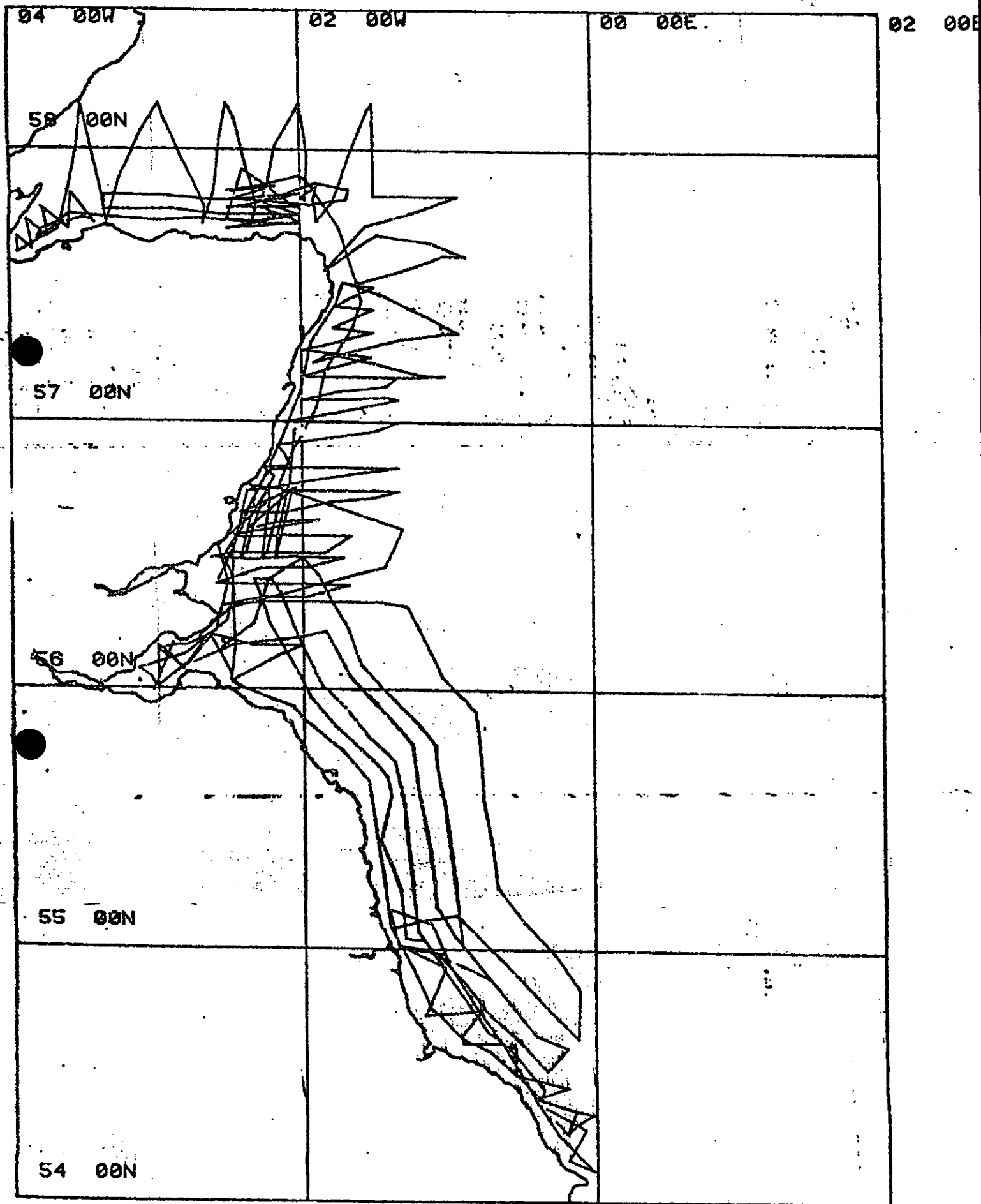
SOUTHERN PART

54.00N	0.30W	50	90	14.5	51
54.30N	1.30W	40	40	0.9	33
"	1.00W	90	90	4.0	75
"	0.30W	100	80	2.5	30
55.0N	1.30W	95	60	9.2	63
55.0N	1.00W	100	60	1.1	28
"	0.30W	100	60	1.3	4
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SOUTHERN PART

Cruise Track RV EXPLORER 14th Jan to 3rd Feb



R.V. EXPLORER SPRAT CRUISE 14 JANUARY TO 3 FEBRUARY 1981

00 00E

TRAWL HAULS AND SECTIONS OF TRACK WITH DENSITIES

GREATER THAN 5 tonnes per sq Km

