

R1/12

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FRV "SCOTIA"

14SR84 MB

Cruise 14/84

REPORT

29 November - 19 December 1984

### Objectives

- 1) To carry out an echo integrator survey for sprats in the Western North Sea between the Moray Firth and Flamborough Head.
- 2) To identify the echo traces using midwater trawls PT154 (Young Gadoid Trawl) and the Isaacs Kidd midwater trawl, and to sample the fish caught.
- 3) To collect acoustic data from each consecutive transmission for subsequent detailed analysis.
- 4) To test 57kHz transponders with the SX200 sonar system.

### Narrative

Prior to leaving Aberdeen, engineers from Simrad installed a modification to the Simrad SX200 fitted during the last refit. This modification up-graded the SX200 to an SX202 by changing the software in the units computing system.

"Scotia" sailed at 1400 on 29 November and proceeded to Gamrie Bay in the Moray Firth to calibrate the acoustic equipment. A survey covering the Moray Firth was executed and 7 trawl hauls obtained to identify traces.

The survey of the Moray Firth was completed by 0800 on 4 December. A second survey grid designed to cover the area from 56°00'N to 57°45'N and from the east coast of Scotland to 01°00'W was executed, with 3 trawl hauls being made to identify fish traces.

This part of the survey was completed by 7 December but prior to that "Scotia" called at Aberdeen on 5 December to collect spare acoustic equipment by pilot boat. Noise performance measurements were made on the Simrad SX202 sonar system at the Buchan Deepes on 6 December and a further acoustic calibration was performed in St Andrews Bay on 7 December. "Scotia" made a second call at Aberdeen on 8 December to land Mr B E Edelsten who was suffering from an ear infection.

The first part of the cruise was completed with a survey of the Firth of Forth; 2 trawl hauls were made to identify fish traces. The vessel docked at 1100 on 10 December for the half landing.

"Scotia" sailed at 1400 on 11 December (Mr Edelsten rejoining at the half landing) and steamed south to survey the area from 56°00'N to 54°00'N and from the east coast of England to the meridian. Trawl hauls were made to identify fish traces at 3 locations.

The survey was completed by 2300 on 15 December and a final acoustic calibration was attempted off Bass Rock on 16 December. A strong easterly swell made a calibration impossible, however, and "Scotia" sailed for the Moray Firth in search of more favourable conditions. A calibration was attempted in Spey Bay, but the strong swell made conditions unsuitable. A 57kHz transponder designed to work in conjunction with the Simrad SX202 was tested using the vessel's small boat.

Deteriorating weather and conditions (NW force 9) prevented a calibration from being completed and "Scotia" sailed for Aberdeen at 1830 on 17 December docking at 0800 on 18 December. The cruise track is appended as Figure 1.

### Results

The distribution of fish during this survey was very different from that observed in January 1983 and January 1984. The largest concentrations of fish were located in the inner Moray Firth with area densities of 40 tonnes per km<sup>2</sup>. The Montrose area, which in some previous years had a large concentration of 0 group sprats, had area densities of 1 tonne per km<sup>2</sup> or less. The Firth of Forth had small concentrations of clupeoids whilst the North East coast had a thin ribbon of clupeoids extending from the Farne Islands south to Newcastle on Tyne. A further small concentration of clupeoids was located off Flamborough Head.

This pattern of fish distribution with most of the fish located in the northern or part of the survey area has not been observed on the earlier January acoustic surveys. However, this survey started 6 weeks earlier than the previous surveys.

A contour diagram of the overall distribution of biomass is appended as in Figure 2.

### Biological Results

The largest catches of 40 and 12 baskets (1 basket = approx 32kg) were made in the inner Moray Firth, all other catches being less than 1 basket. The weight of each species in a haul was calculated using weight-length relationships. The proportion of sprats to herring and sprats combined by weight in the catches varied from 23 - 75% in the Moray Firth, 100% on Smith Bank, 20 - 70% of the Scottish East coast, 73 - 93% in the Firth of Forth and 30 - 90% of Northeast England. Other species caught included cod, haddock, whiting and plaice. The sprats caught in the inner Moray Firth were mostly 1-group (1983 year class); elsewhere sprats were predominantly 0-group. The mean length of the 0-group sprats varied from 8cm in the Moray Firth and Scottish East coast to 4.5cm off Flamborough Head. In the 2 hauls in the inner Moray Firth there were 11% and 13% 1-group and older herring, in the rest of the hauls herring were predominantly 0-group. An Isaacs Kidd midwater trawl was taken after each trawl haul. Where there was any catch this was preserved for subsequent analysis. A sample of sprats was taken from the Moray Firth for morphometric analysis and sample of small 0-group herring was frozen for otolith examination.

The Simrad SX202 sonar was used extensively throughout the survey. The modification has greatly improved the presentation of the sonar data, allowing small shoals of fish to be tracked with ease. The new menu-driven control system simplifies the operation of the machine, most of the operations being controlled by 3 buttons.

Noise measurements were made on the SX202 sonar which will be forwarded to Simrad for analysis. The raw data seem to suggest that the noise levels on "Scotia" are independent of the ships speed and the direction in which the sonar is trained.

A Universal Sonar 57kHz transponder was tested with the Simrad SX202 sonar. It failed to operate and will be returned to the makers for modification or repair.

seen in draft OIC

J I Edwards

J W Gillon

28 January 1985

Table 1

Location of trawl hauls made to identify fish traces

|     |           |          |                                      |
|-----|-----------|----------|--------------------------------------|
| 191 | 57°40.5'N | 3°43.6'W | Nairn Bay                            |
| 192 | 57°47.5'N | 2°31.0'W | 6 miles North of Macduff             |
| 193 | 57°41.3'N | 3°45.3'W | 5 miles SE of the North Sector       |
| 194 | 57°47.0'N | 2°08.0'W | 7 miles NNE of Troup Head            |
| 195 | 57°46.6'N | 2°23.5'W | 5 miles NW of Troup Head             |
| 196 | 58°09.9'N | 2°51.6'W | Smith Bank                           |
| 197 | 58°01.3'N | 1°46.7'W | 19 miles N of Kinnairds Head         |
| 198 | 57°13.5'N | 1°46.0'W | 11 miles E of Girdle Ness            |
| 199 | 56°31.0'N | 2°21.0'W | 5 miles E of Arbroath                |
| 200 | 56°20.0'N | 2°29.0'W | 3 miles NNE of North Carr Light Buoy |
| 201 | 56°06.0'N | 2°52.0'W | Outer Firth of Forth                 |
| 202 | 56°05.0'N | 2°32.0'W | Outer Firth of Forth                 |
| 203 | 54°08.0'N | 0°00.2'W | 1 mile N of Flamborough Head         |
| 204 | 55°04.5'N | 1°22.0'W | off Blyth                            |
| 205 | 55°28.6'N | 1°31.0'W | 3 miles E of Castle Point            |

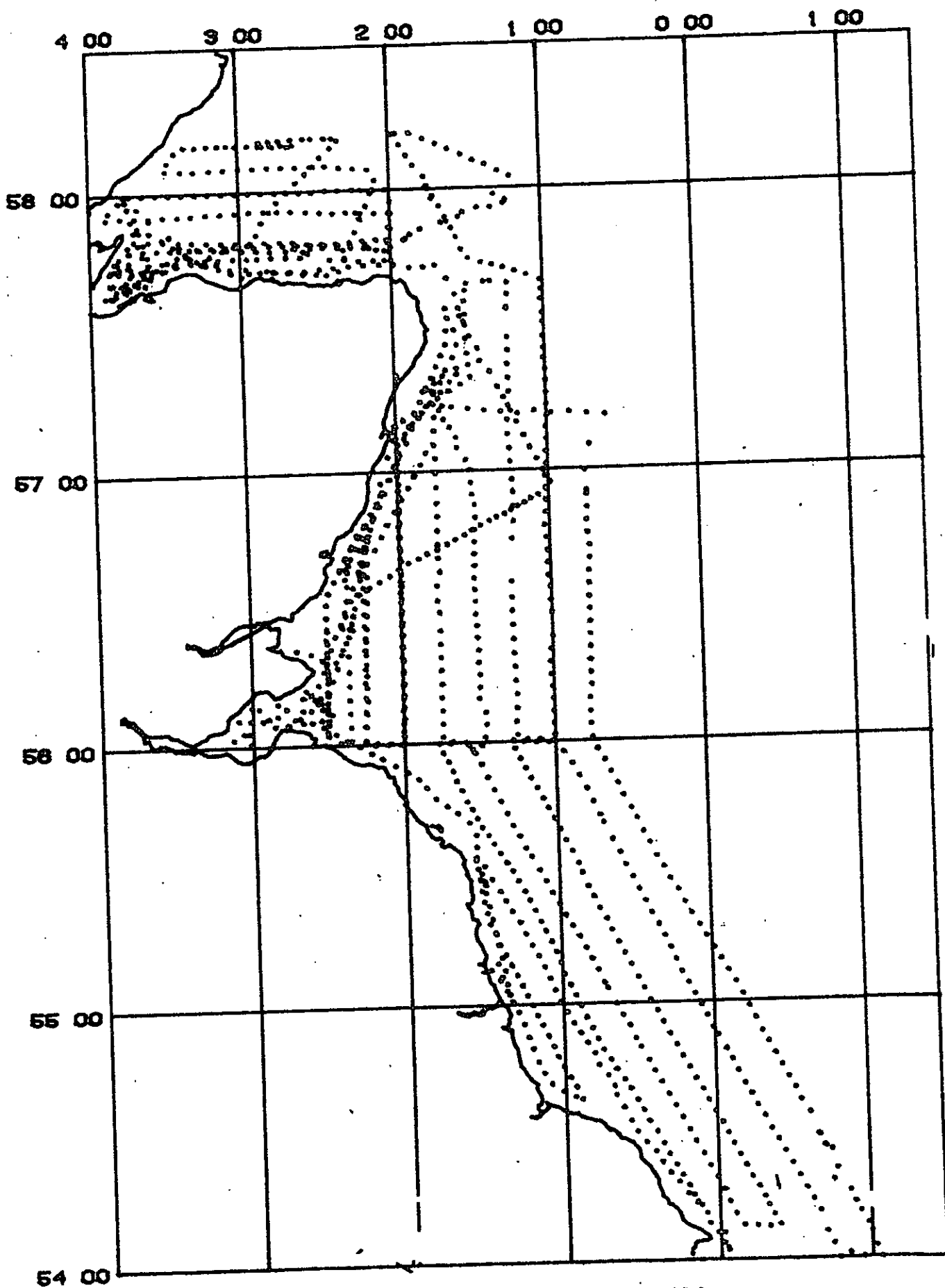


Fig 1 CruiseTrack: Scotia 29/11-19/12/84

4 00

2 00

0 00

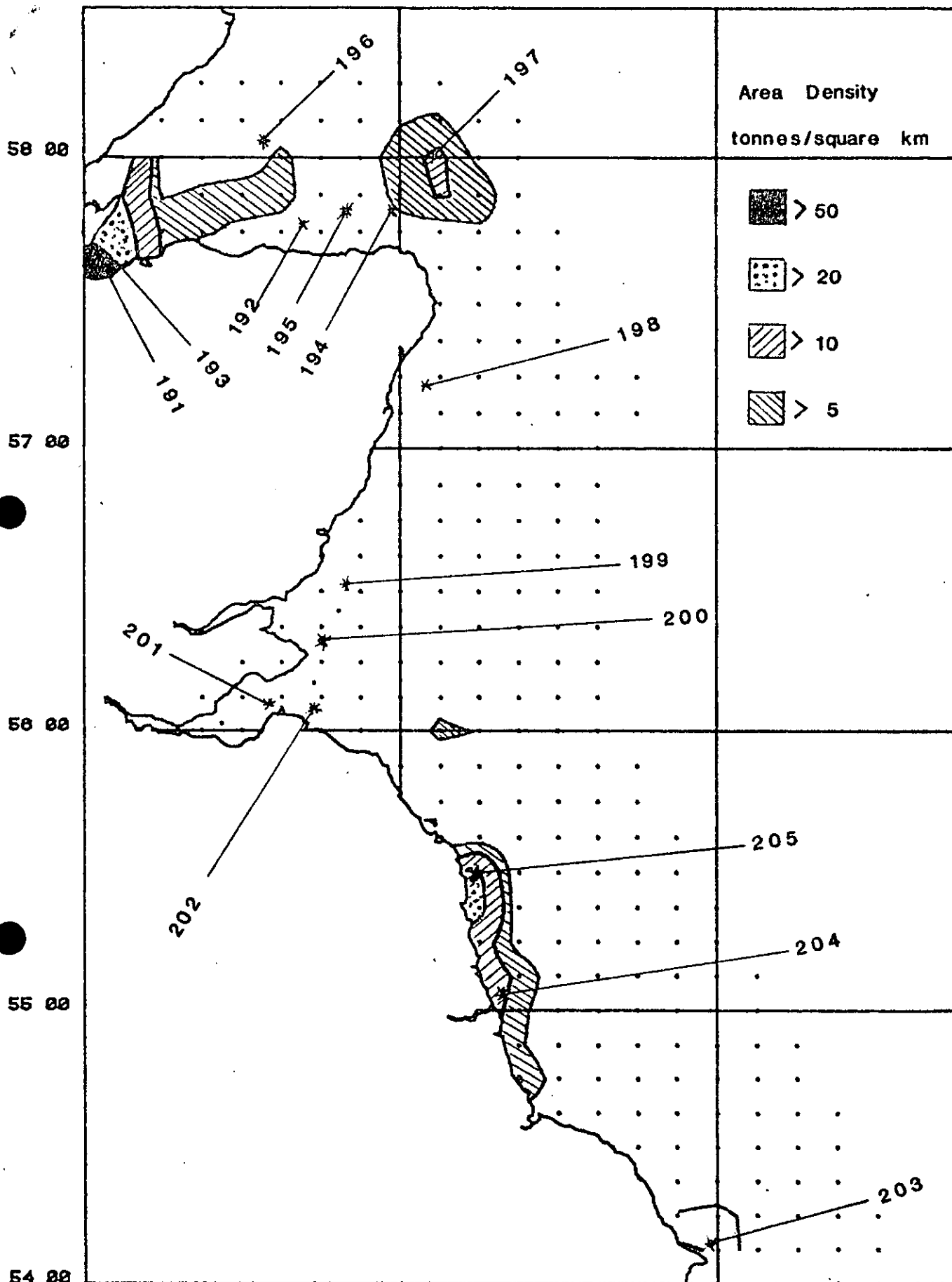


Fig 2

Contour Diagram

with Trawl Hauls