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Not to be cited without prior reference to the Marine Laboratory Aberdeen

FRV *Scotia*

Cruise 0100S

REPORT

Part 1: 6-8 January 2000
Part 2: 8-20 January 2000

Personnel

Part 1

J M Pirie (In charge)
D C Moore
C D Hall
L A Campbell

Part 2

D G Reid (In charge)
P J Copland
K Peach
S Halewood
R Watret

Objectives:

Part 1

To undertake water, sediment and biological sampling at the Scottish east coast sites for the National Marine Monitoring Plan (NMMP)

Part 2

To carry out a combined acoustic and trawl survey on the western mackerel stocks immediately prior to the start of the migration.

Out-turn costs per project: MF01t - 13 days, AE10n-Z

Narrative:

Part 1

Following loading, *Scotia* sailed at 1100 hours on 6 January. Sampling was carried out according to the procedure set out in the cruise programme and with all objectives successfully completed *Scotia* docked in Aberdeen at 1000 hours on 8 January. All biological/sediment

samples and sampling equipment was unloaded and returned to the laboratory where all samples were stored for subsequent analysis.

Part 2

Scientific staff joined *Scotia* in Aberdeen on the morning of the 8th. Based on new information on commercial fishing activity, the vessel proceeded to the area north of the Butt of Lewis. The initial survey track utilised zig-zag transects on a 15 mile baseline (see Fig. 1) between 5° and 7°W, between the 90 and 220 m isobaths. Good mackerel concentrations were located on this part of the survey and on a repeat coverage in the opposite direction. No successful fishing was carried out due to weather and netsonde problems. Despite continuing appalling weather the survey continued on the same transect basis north-east to Muckle Flugga, and thence to Tampen Bank. In the survey area east of Flugga the southern limit was set at 61°N. Good concentrations of mackerel were located at the 200 m contour at about 0° 30'N. The final section of the survey was down the 200 m contour from Tampen Bank to south of Viking Bank, very few mackerel were seen during this phase.

Only eight fishing operations were carried out successfully due to a combination of weather and continuing problems with the netsonde. These caught mostly mackerel and herring and some Norway pout and haddock. Weights, lengths, maturity, stomach contents and otoliths (age) were recorded for mackerel from all hauls, lengths only for other species. Weather was generally too poor for CTD recordings so only four CTD stations were carried out. Thermosalinograph data was recorded throughout the survey.

The vessel steamed to Aberdeen for unloading on the morning of the 20th.

Results:

Part 2

Based on the available data it had been assumed that the mackerel at this time of year were to be found concentrated in the area of the Viking Bank in the North Sea. This scenario was first observed in December of 1995 and 1995 during the SEFOS project. Subsequent analysis of commercial data showed that this had continued until the 1998 fishing season (January-March 1998). The situation was largely the same in 1999 but there was some evidence of a component of the adult stock leaving the Viking Bank area in late December. However, consultation with fishermen, laboratory port sampling officers and the SFPA showed that the migration this winter had started possibly as early as late November 1999, and that the fish had reached at least as far as the waters north-west of the Hebrides by the time of the survey.

The survey was still able to identify the main areas of mackerel concentration, from the Hebrides to Viking Bank. Biomass results are not yet available, however a map showing the distribution of mackerel schools and the echo energy recorded from these is presented in Figure 1. It is clear that there were at least two distinct groups of migrating fish, one at the Butt of Lewis and a second NE of Muckle Flugga. The previously identified concentration area in the deep water adjacent to Viking Bank only had relatively few mackerel at this time.

Weather conditions during the survey were deplorable. Gale force winds were recorded on all but one day of the survey, and this meant that it was rarely possible to fish. When fishing was possible, the motion often resulted in damage to the netsonde cable preventing continuation. This resulted in very limited biological data. Fortunately there was considerable commercial

activity in the area, and the landings from these vessels were sampled by the Laboratory port sampling programme. These data will be used to supplement the survey trawl data.

It should therefore still be possible to produce a full stock estimate for the migrating western mackerel stock based on this survey. This will be the first time this has been achieved and will be valuable, if continued, for providing fisheries independent data between the years of the triennial mackerel egg surveys.

Additionally, the survey has demonstrated that there has again been a substantial change in the timing of the mackerel spawning migration. During the survey it was possible to track one particular school over a number of hours. This school was travelling at approximately one knot. If we assume that this was representative and maintained a journey to the Butt of Lewis area from Viking Bank would take approximately 20 days. Given that the school was tracked on 11 January, this would imply the latest start date for their migration would be 22 December. If there were pauses on the migration or this speed was not constantly maintained the departure date could be earlier. The observed changes in migration timing will undoubtedly have a major impact on fishing practice.

Initial information suggests that most major fishing activity by Scottish (and presumably Irish and Dutch) pelagic vessels was concentrated west of the 4°W line, and therefore out of the North Sea. As available data suggests that the mackerel of the North Sea spawning component may also overwinter near the Viking Bank, this change may reduce fishing pressure on this component, which should increase the chances for this long moribund stock to recover.

A full survey report will be prepared giving the mackerel biomass distribution and surface temperature and salinity patterns. Where possible the changes in spatio-temporal pattern of temperature particularly since the last survey in 1995 will be determined, and any environmental correlates examined. The report will be presented to the Mackerel Assessment Working Group as a Working Document.

D G Reid
14 February 2000

Seen in draft: P Ramsay, OIC

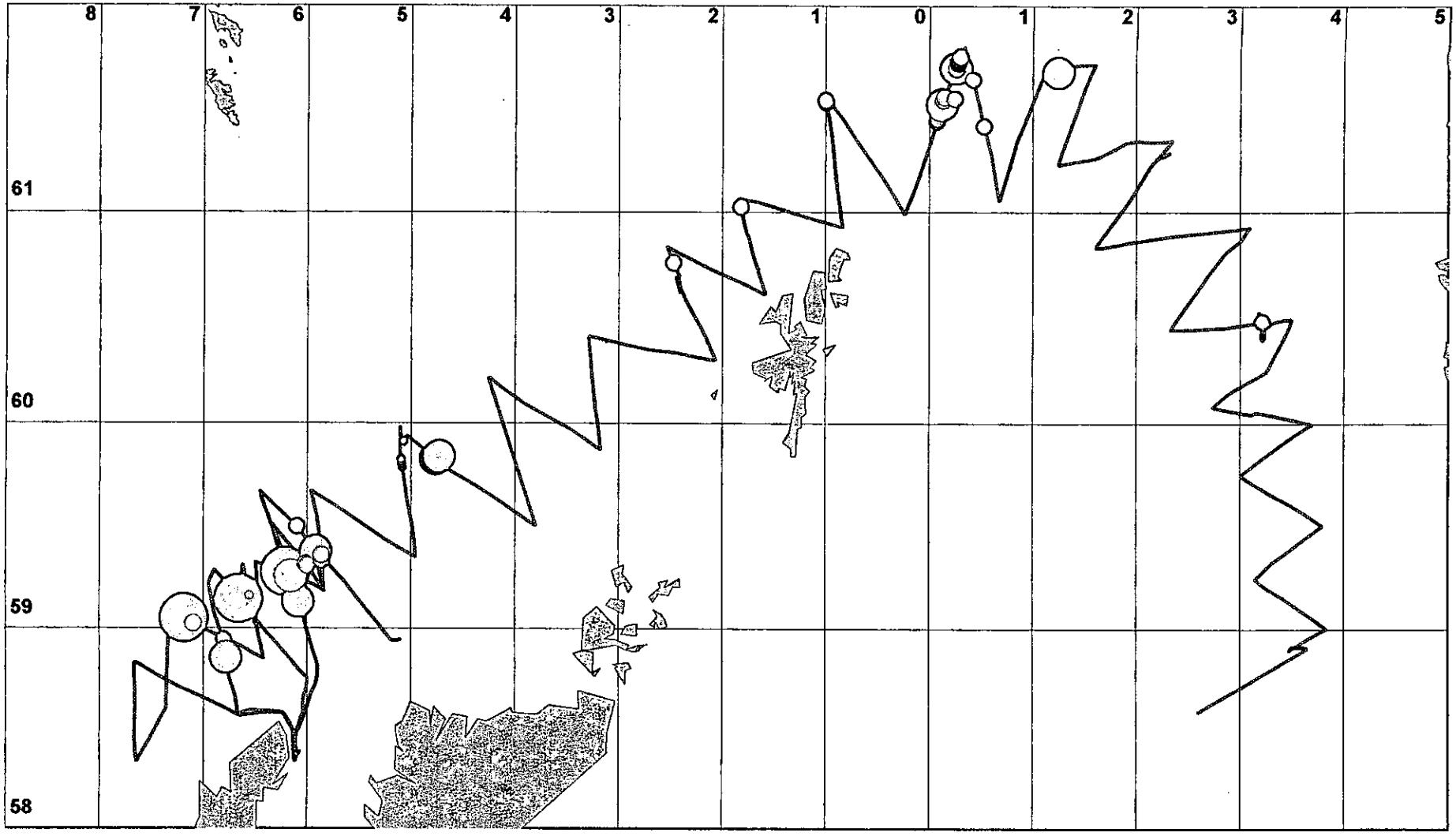
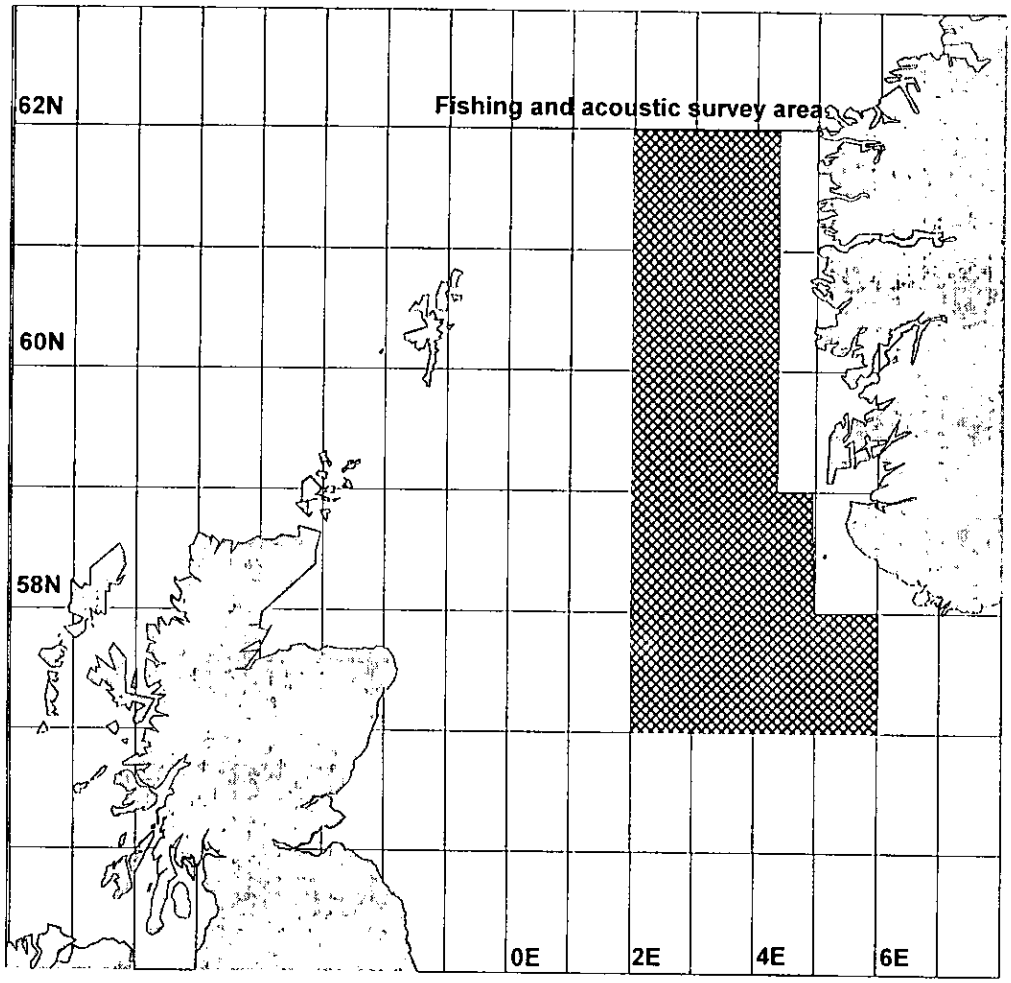


Figure 1. Cruise track and observed mackerel schools on survey S0100 8 - 20 January 2000



Area of operations for FRV Scotia fishing and acoustic survey 0100S