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FRV *Clupea*

Cruise 1098C

REPORT

12-29 June 1998

Personnel

S P R Greenstreet	SSO (in charge)
F Armstrong	HSO (12-16 June)
C Doyle (Ms)	SO
J McWilliam (Ms)	ASO (16-22 June)
R Li (Ms)	ASO (12-22 June)
H Emmerson (Mrs)	ASO (16-29 June)

Cruise Objectives

To carry out an acoustic survey, backed up by pelagic trawling, to determine the biomass and distribution of pelagic fish in an area off the Firth of Forth which included the Wee Bankie and Marr Bank. To assess the abundance and distribution of seabirds in the area using standard transect census techniques and to locate the feeding sites of dye-marked kittiwakes breeding on the Isle of May. To record the location of all marine mammals observed at sea. To map seabed sediment type using the acoustic system RoxAnn and to collect sediment samples to "groundtruth" the RoxAnn data. To determine spatial variation in the water temperature and salinity profile within the study area. To carry out a bottom trawl survey to determine the abundance, distribution and length composition of piscivorous demersal fish species and to collect stomach samples from these fish to determine spatial variation in their diet. To determine weight-length relationships for each fish predator species, and examine spatial variation in fish condition. To carry out a night-time grab survey, over sediments previously determined as suitable sandeel habitat, to assess sandeel abundance and distribution. The sediment samples collected during this survey will also be used to assess the RoxAnn derived sandeel habitat map.

Out-turn days per project: 18 days C578**Narrative**

The heavy scientific equipment was loaded onto *Clupea* on 8 June at Fraserburgh. The lighter equipment was loaded the following day and the laboratory was set up. Scientific staff joined the vessel on 12 June at 1100 hours and the ship sailed at 1230 hours. *Clupea* made straight for the southern end of the study area and anchored off Dunbar. The following day acoustic and seabird/marine mammal survey commenced. Figure 1 shows the acoustic survey track steamed and indicates those sections of track where seabird and marine mammal survey was also undertaken. Concentrations of pelagic fish were sampled using an International Young Gadoid Trawl (PT154 with 6 mm cod-end) to determine species composition, length frequency distributions, length-weight relationships and samples of fish had their otoliths extracted to

determine age at length relationships. The positions of the trawl samples are also indicated on Figure 1.

All acoustic and seabird survey work was carried out between 0400 hours and 1600 hours; the time when sandeels were expected to be most active, and therefore most likely to be encountered in the water column rather than buried in the sediment. Instances where seabirds were seen to be carrying prey were recorded. Where possible, prey items were identified and their size estimated relative to the bird's bill length. Kittiwakes were examined carefully to look for the presence of dye-marks. No dye-marked individuals were recorded during the cruise. All sightings of marine mammals at sea were recorded, whether as part of the seabird survey, or just simply opportunistic sightings. The species, number of individuals involved, time and position were noted.

Survey commenced at the southern-most transect and worked north. On 13 June the southern most transect was completed and the next transect north was almost completed. On 14 June an attempt was made to survey the two transects off Fifeness, however, bad weather prevented adequate seabird and marine mammal survey coverage, so *Clupea* turned south to pick up where she had finished the previous day and the transect running west into the Firth of Forth was completed. Having finished this, *Clupea* steamed east to a point 15 NM east northeast of Fifeness and resumed acoustic and seabird/marine mammal survey running west before the heavy seas and rain. The following day conditions were too poor to allow any work and *Clupea* lay at anchor in the lee of the Isle of May. On 16 May conditions had improved and the two transects running east of Fifeness were completed. On completion at 1400 hours, the vessel steamed for Montrose to change scientific staff and to replace the pelagic fishing gear with Demersal rockhopper trawl (BT158 with 10 mm cod-end). Eric Armstrong left the vessel and Jane McWilliam and Helen Emmerson joined *Clupea*. The loss of a day to bad weather meant that two transects in the north of the study area could not be surveyed.

Clupea departed Montrose at 1730 hours on 17 June and steamed to anchor off the Isle of May. Over the following four days 18 of the 20 demersal trawl stations shown in Figure 2 were fished, towing for half an hour. The catch weights and length frequency distributions (to the cm below) of whiting, haddock, cod, herring, sprats and sandeels were determined. Length-stratified (using the ICES stomach sampling size strata for fish greater than 12 cm in length) sub-samples of cod, whiting and haddock were remeasured (to the half cm below) and weighed to determine length-weight relationships and to establish body condition, their stomachs and intestines were removed for dietary and consumption rate analysis, and their livers and gonads were retained to determine gonado- and hepato- somatic indices. Up to 25 fish per species, size stratum and haul were examined and their feeding status assessed (feeding, regurgitated or not feeding) until 10 feeding fish had been encountered. On 22 June the last trawl station was fished and *Clupea* steamed for Montrose, tying up at 1200 hours to allow Jane McWilliam and Rose Li to leave the vessel. One trawl station in the Firth of Forth was not fished because of the high risk of gear loss or damage associated with this location.

A SEABIRD CTD sampler and a Day grab were deployed at each demersal fishing station (Fig. 3), one immediately before and the other immediately following each fishing operation. The CTD sampler was used to gather information regarding spatial variation in the salinity and temperature profile through the water column in each study area, while the Day grab was used to collect sediment samples for particle size analysis to allow "groundtruthing" of the RoxAnn data.

Clupea remained in Montrose till 1600 hours on 23 June to allow for the change over from daytime working to a night time regime. Over the nights of 23-27 June a total of 209 grab

stations were sampled (Fig. 3). As far as possible this work was carried out between the hours of 2000 hours and 0400 hours, when light levels were least. Samples of the sediment were retained for particle size and chemical composition analysis. All sandeels caught were measured and weighed and had their otoliths extracted for age determination.

Grab sample operations were completed by 0230 hours on 28 June and *Clupea* sailed for Fraserburgh where she arrived at 1100 hours. The scientific equipment was offloaded and Marine Laboratory staff left the ship at 1100 hours on 29 June.

Simon Greenstreet
15 April 1999

Seen in draft: A Simpson, OIC

Figure 1. Acoustic survey track indicating sections where seabird/marine mammal survey was also undertaken (filled circles). The positions where three pelagic fishing samples were taken are also shown (squares).

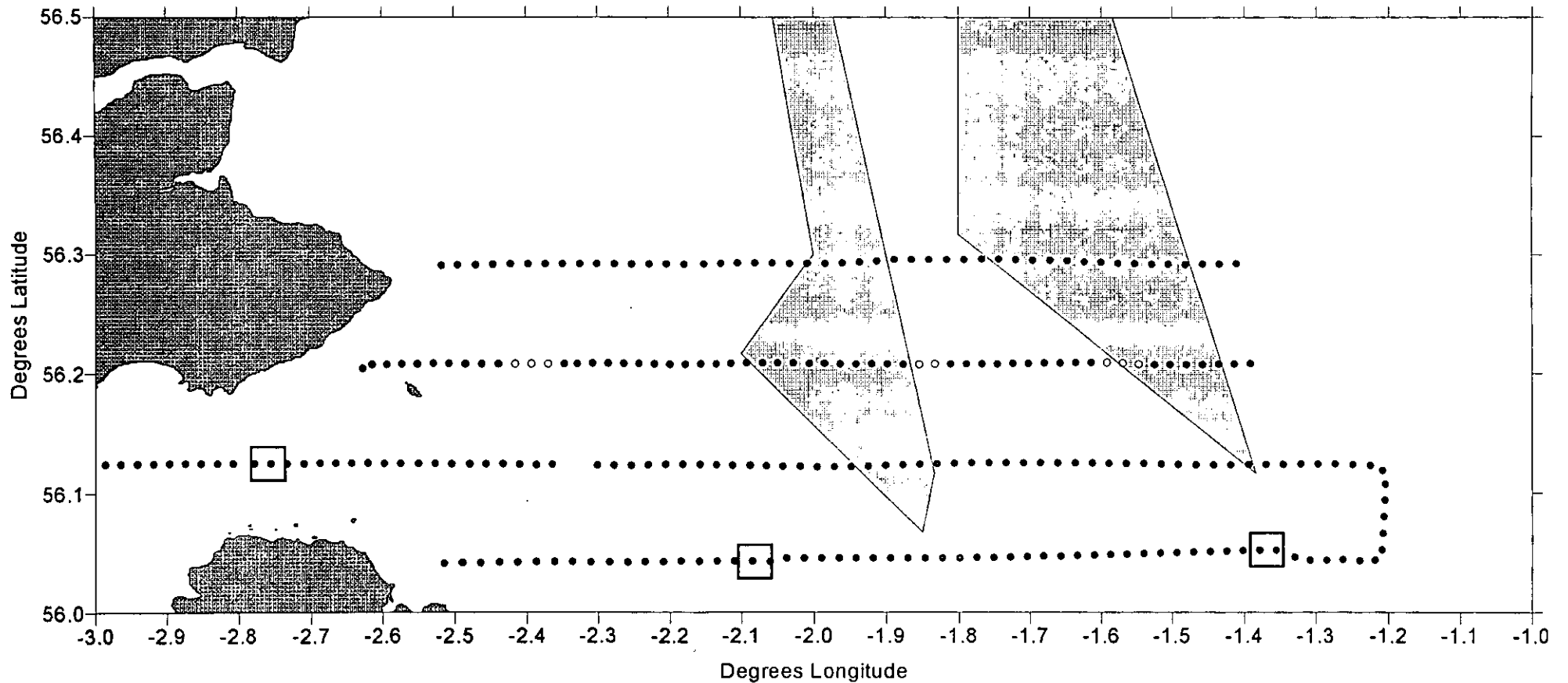


Figure 2. Locations of demersal trawl samples.

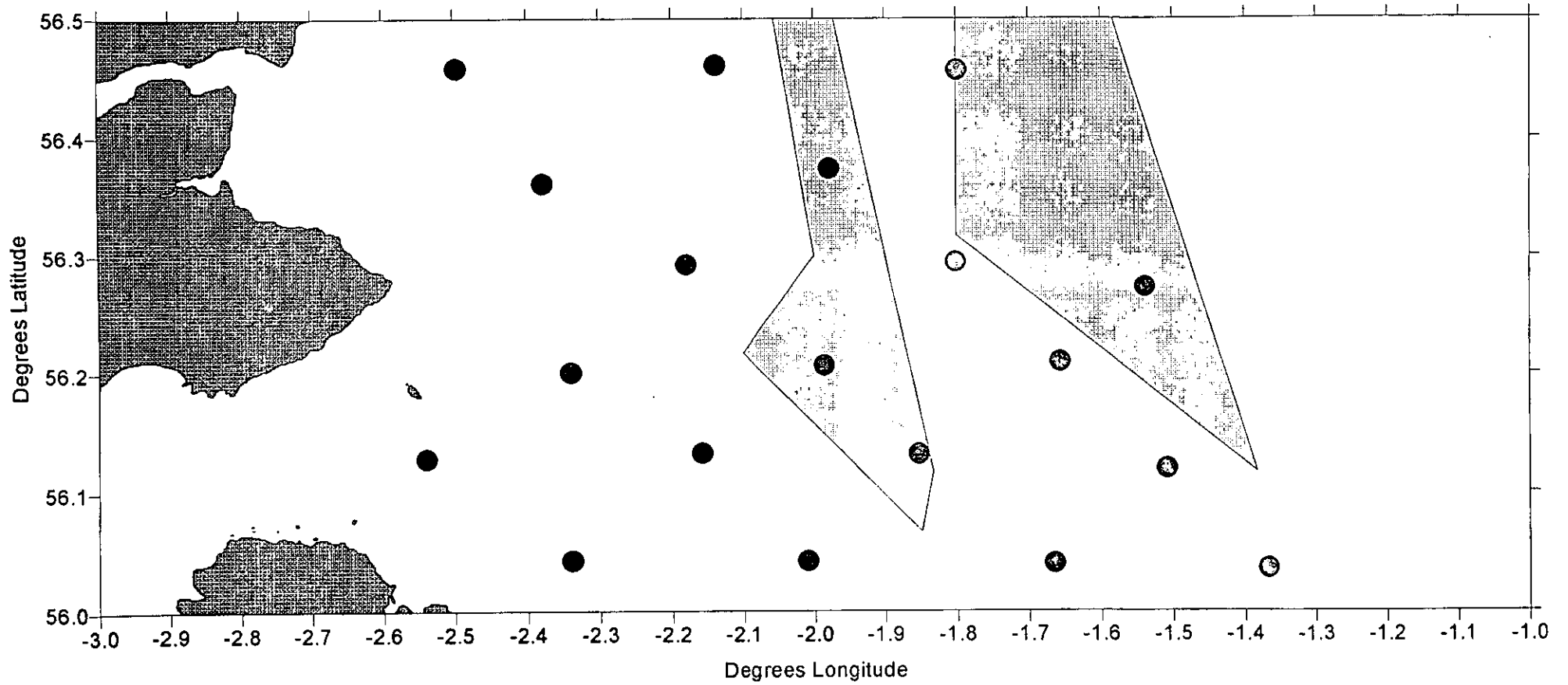


Figure 3. Locations of grab samples to assess sandeel density.

