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FRV CLUPEA

Cruise 0297C

REPORT

20 January - 5 February 1997

Personnel

S P R Greenstreet	SSO (in charge)
F Armstrong	SO
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I D Tuck	Contract Staff

Objectives

To carry out an echo-integrator survey to determine the biomass and distribution of pelagic fish in the Moray Firth. Trawling was carried out in areas with high densities of pelagic fish in order to determine fish species, size and age composition and weight-length relationships, and to collect samples of herring, sprat and sandeels for subsequent diet analysis in the laboratory. To determine the numbers and distribution of mammalian and avian predators using transect census methods. To determine spatial variation in water temperature and salinity depth profiles using a CTD recorder and to collect water samples for nutrient and chlorophyll analysis. To determine spatial variation in zooplankton density using a Dutch Gulf III sampler.

Out-turn days per project: 8.5 days GAC1; 8.5 days HAB1

Narrative

The scientific equipment was loaded onto *Clupea* on 17 January. Scientific staff joined the ship on the morning of 20 January at Aberdeen and the ship sailed at 1100. Calibration of the acoustic integration equipment was carried out whilst at anchor in Cullen Bay during the night of 20 January.

Acoustic and top predator survey work was carried out during daylight hours (between 0800 and 1630) between 21 and 27 January. The density of seabirds, seals and cetaceans was assessed using standard survey methods. Figure 1 shows the acoustic survey track and indicates the sections of cruise track where top predator census data were collected. In addition to the formal top predator survey, all casual sightings of seals and cetaceans were also noted. Concentrations of pelagic fish were sampled using an International Young Gadoid Pelagic trawl (PT154) with 6 mm mesh size cod-end. The distribution of these hauls is also shown in Figure 1. Samples of fish from each haul were measured to determine length

frequency distributions following standard procedures. Otolith samples were collected from herring and sprats, and fish were weighed to determine length weight relationships. Samples of 10 herring and sprat per 5 mm length category from each haul were retained for diet analysis.

Acoustic and top predator survey finished at Invergordon on 27 January. The following day five hydrographic stations were sampled and a calibration of the Gulf III was made whilst on route for Inverness for the half landing. *Clupea* tied up at Inverness for the half landing at 1400 on 28 January and sailed again at 1430 the next day.

Between 29 January and 1 February all but three of the remaining 54 hydrography stations were visited. A CTD sampler was deployed to obtain water temperature and salinity profiles with three reverser bottles on the cable, one at the sea surface, one 10 m deep and the third close to the seabed, to obtain samples for nutrient and chlorophyll analysis. The Dutch Gulf III sampler was deployed when leaving each station to collect samples of small bodied zooplankton, except at some stations in the inner Cromarty and Inverness Firths where the water was too shallow. On 2 and 4 February a series of five transects, in the region where most of the pelagic fish marks had been found, were sampled at two mile intervals using the CTD sampler. These transects picked up the remaining three main hydrography stations and at these locations the full set of samplers was deployed. Figure 2 shows the main hydrography sampling grid of 59 stations and indicates those stations where the Gulf III was not deployed. Figure 3 shows the five CTD transects; each of nine stations.

Gale force winds on 3 February forced *Clupea* to remain in Buckie for the day.

Survey work ceased at 1400 on 4 February and *Clupea* sailed for Fraserburgh where she arrived at 1930. The scientific equipment was offloaded and scientific staff left the ship on the morning of 5 February.

S Greenstreet
19 February 1997

Seen in draft: A Simpson, OIC

Figure 1. Acoustic/seabird survey track. Circles show mid-point locations of five minute survey periods (open circles - no seabird data). Squares show pelagic trawl positions.

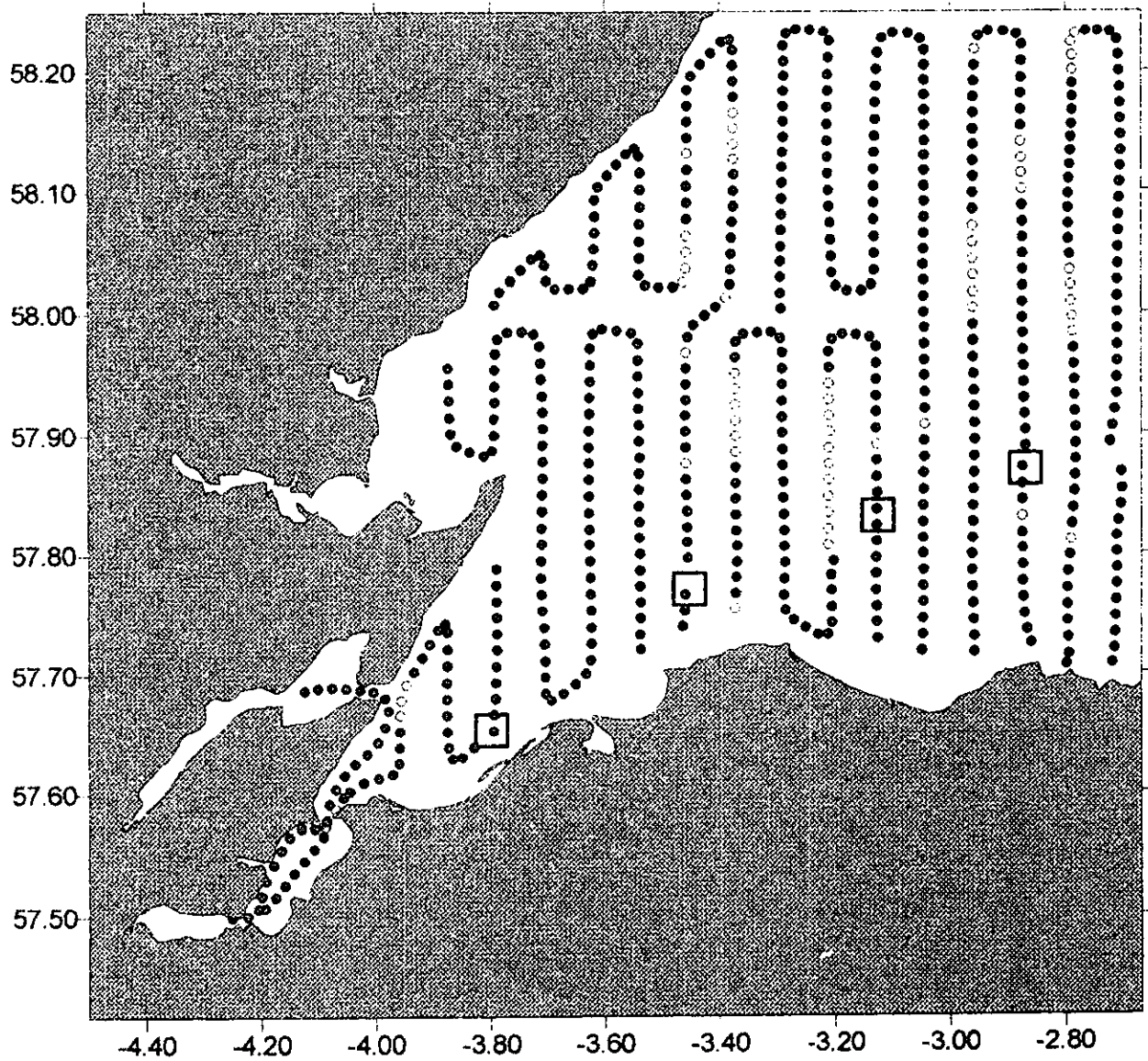


Figure 2. Main hydrographic sampling station grid. Filled circles show stations where CTD, reverser bottle and Gulf III samples were all collected. Open circles show stations where the Gulf III was not deployed.

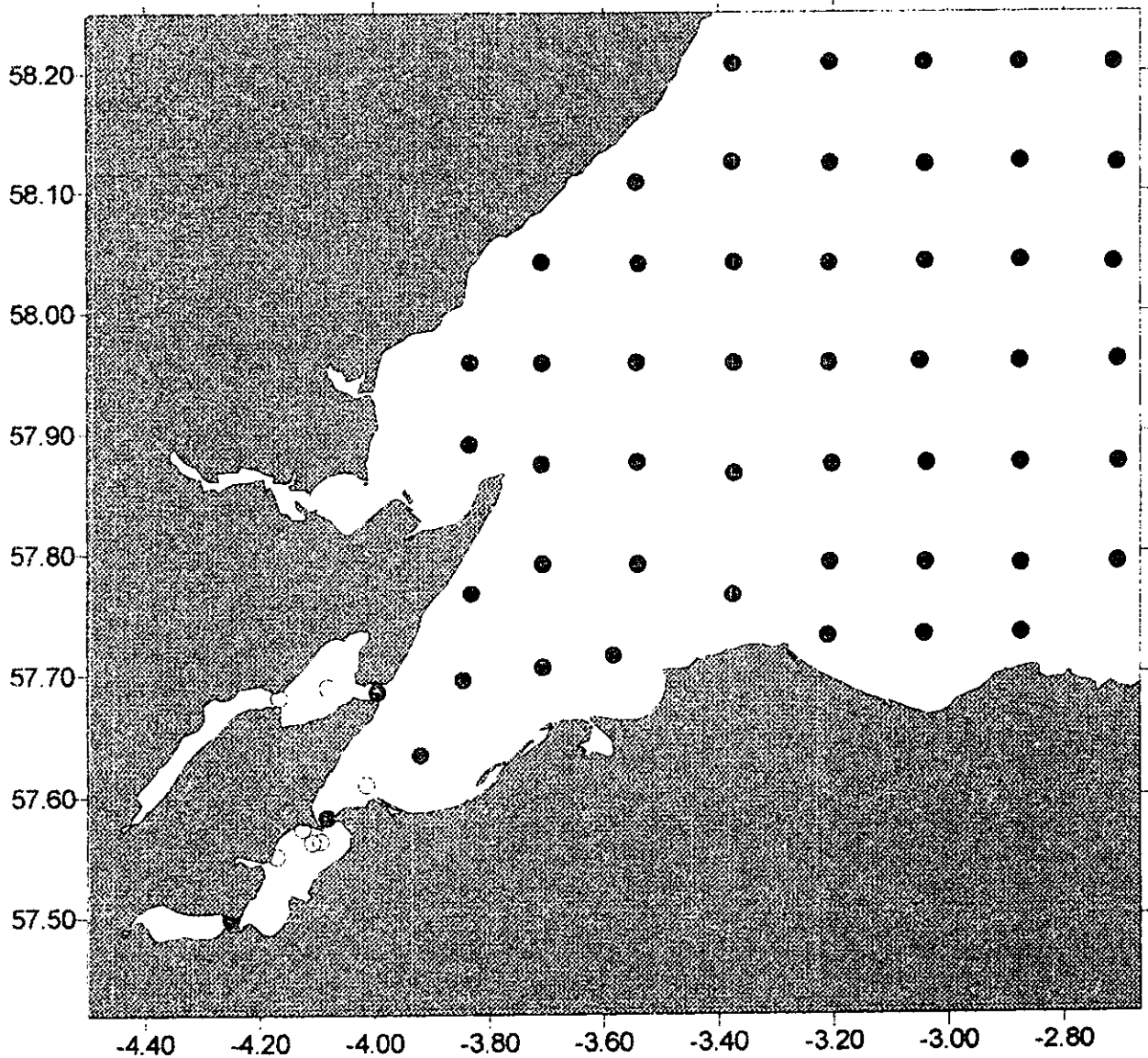


Figure 3. Intensive CTD sampling transects.

