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FRV *Clupea*

Cruise 0198C

REPORT

7-21 January 1998

Personnel

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F Armstrong	SO
I M Gibb	SO
S G Bowe	SO
K Liu	PhD Student

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: 15 days GAC1

Narrative

The scientific equipment was loaded onto *Clupea* on 6 January. Scientific staff joined the ship on the morning of 7 January at Fraserburgh and the ship sailed at 1730.

Acoustic and top predator survey work was carried out during daylight hours (between 0830 and 1600) between 8 and 17 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 codend (Fig. 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.

During the late afternoons and early evenings of 8 to 17 January 50 Hydrographic stations were visited (Fig. 2). At each station a CTD sampler was deployed to obtain water temperature and salinity profiles. Three reverser bottles were fitted to 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. Salinity samples were collected from the reverser bottle close to the seabed to assess the CTD calibration. A Dutch Gulf III sampler was deployed when leaving 46 of these stations to collect samples of small bodied zooplankton. Four stations, three in the south of the study area and one in the Inverness Firth were too shallow to sample using the Gulf III (Fig. 2).

After carrying out acoustic and top predator survey in the morning, *Clupea* sailed into Inverness in the early afternoon of 16 January for a half landing, and to replenish water supplies and pick up Chlorophyll sampling filters from the harbour office. She left port at mid-day on 17 January and completed the acoustic/top predator survey work into the Cromarty Firth. The last of the main grid of hydrographic and zooplankton sampling stations were visited during the evening of 17 January.

The following day *Clupea* attempted to fish an area where concentrations of pelagic fish had been detected earlier in the cruise, but poor weather prevented any fishing. *Clupea* returned to anchorage in the Cromarty Firth for the rest of the day. Bad weather again prevailed on 19 January, so *Clupea* tied up at Invergordon for the day. On 20 January *Clupea* sailed at 0500 and steamed east to carry out intensive CTD sampling along two transects where the main fraction of the pelagic fish had been detected (Fig. 3).

Survey work ceased at 1530 on 20 January and *Clupea* sailed for Fraserburgh where she arrived at 2000. The scientific equipment was off loaded and scientific staff left the ship on the morning of 21 January.

S Greenstreet
11 February 1998

Seen in draft: A Simpson, OIC

Fig. 1. Cruise track (circles) and pelagic trawl sample (squares) locations. Circles indicate mid-points of 5 min observation periods (filled - seabird data collected, open - no seabird counts).

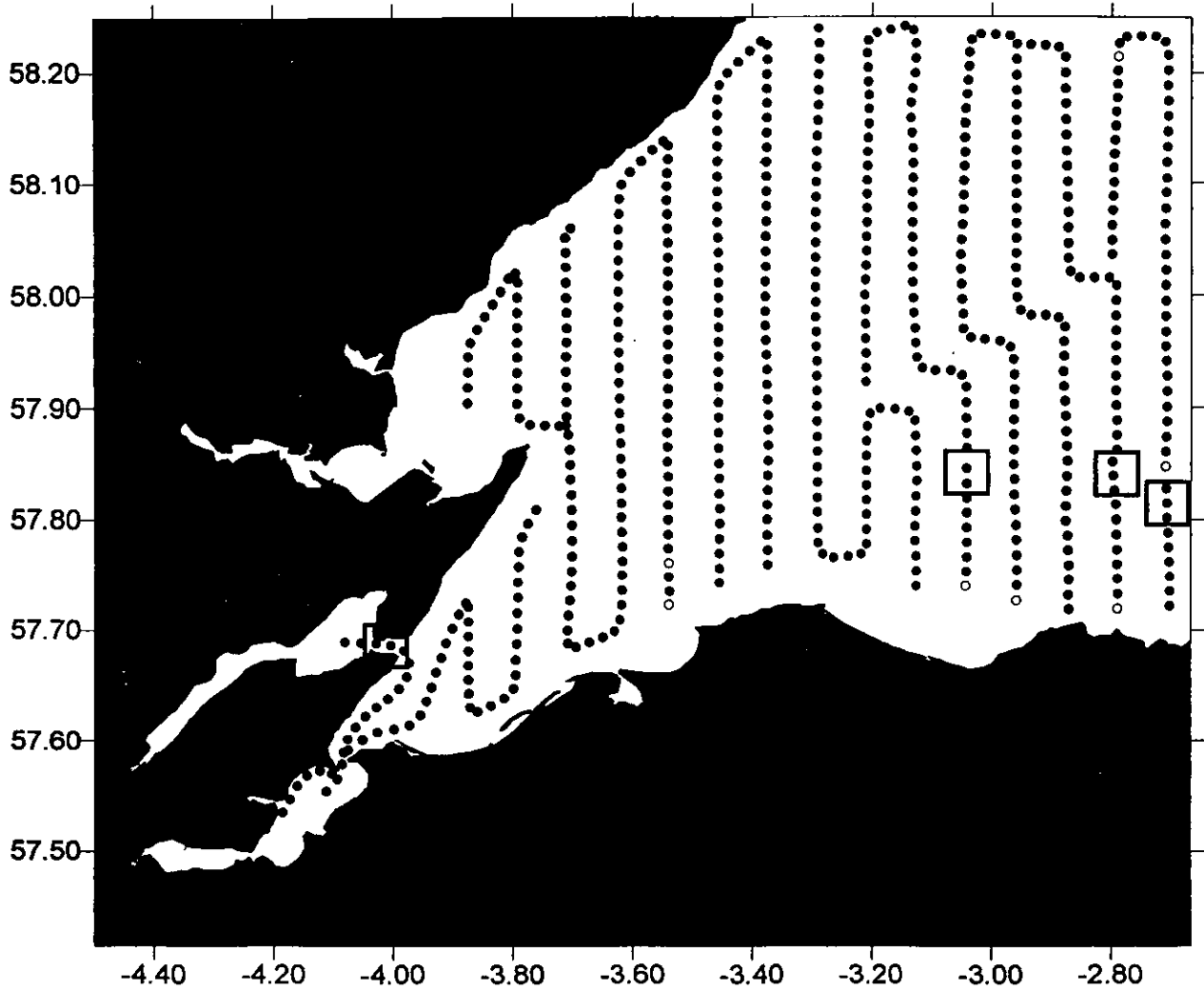


Fig. 2. Main grid of CTD, nutrient and chlorophyll sampling stations (circles) and Gulf III zooplankton samples locations (diamonds).

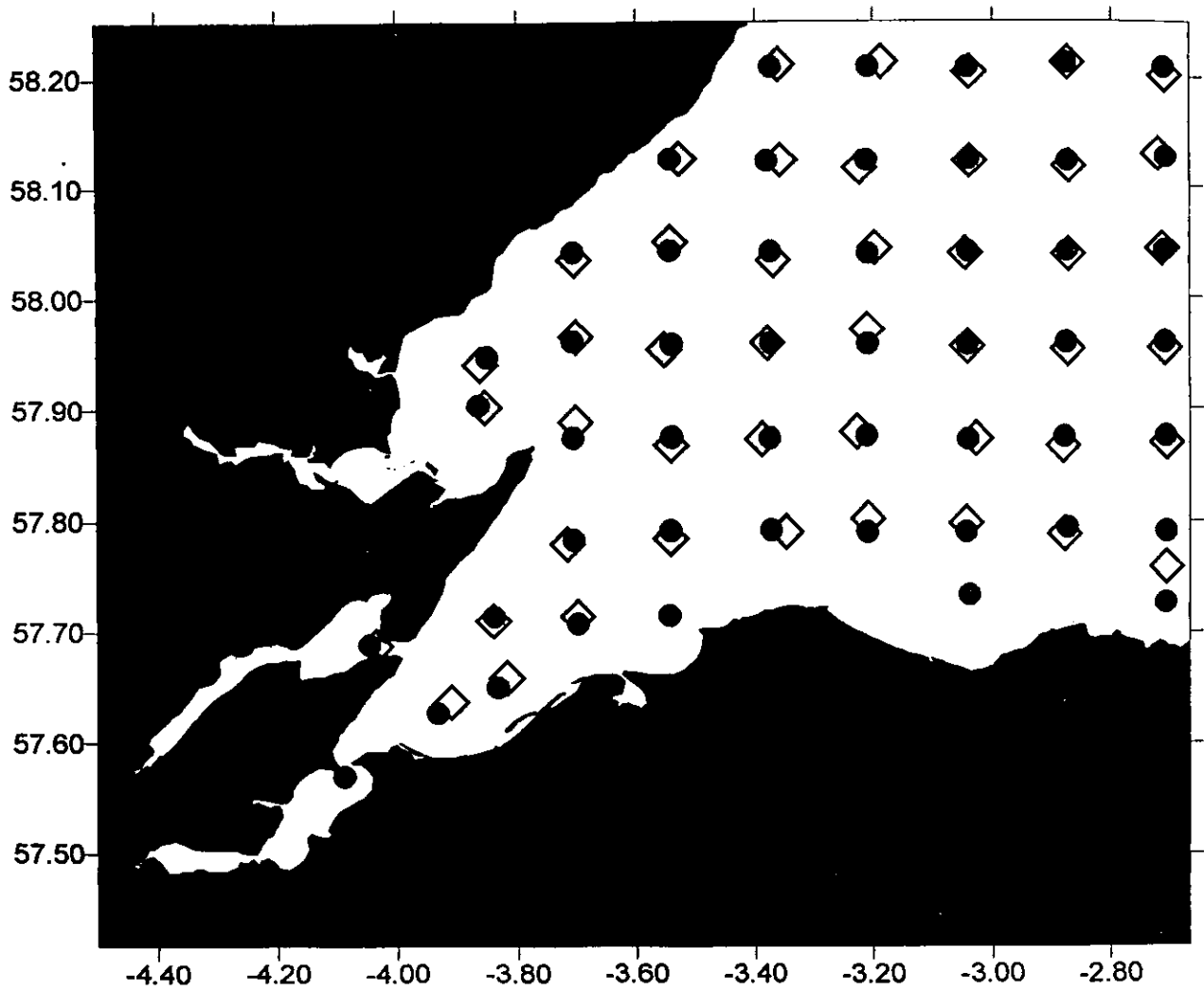


Fig. 3. Locations of sampling stations in the two intensive CTD transect.

