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FRV *Clupea*

Cruise 1597C

10-19 September 1997

REPORT**Personnel**

S P R Greenstreet	SSO (in charge)
G S Begg	HSO
F Armstrong	SO (10-14 September)
I M Gibb	SO
J W Donald	ASO (14-19 September)
R Li	ASO

Objectives

To carry out an echo-integrator survey to determine the biomass and distribution of pelagic fish in an area off the Firth of Forth encompassing the Wee Bankie and Marr Bank sandeel grounds. To sample areas with high densities of pelagic fish using a pelagic trawl in order to determine fish species, size and age composition and weight-length relationships. To map seabed sediments using RoxAnn, an acoustic survey technique, with associated sediment sampling by Day grab to "groundtruth" the acoustic data. To determine spatial variation in water temperature and salinity depth profiles using a Seabird CTD instrument. To determine the numbers and distribution of avian and mammalian predators in the study area using transect census methods. To determine the abundance and distribution of piscivorous demersal fish species by bottom trawl survey. To assess the length and age composition of these piscivorous fish predators, together with their age-length and length-weight relationships, and to collect stomach samples for diet and food consumption analysis. Also to examine the livers and gonads (where possible) of these demersal fish for assessment of body condition.

Out-turn days per project: 10 days C578 (ELIFONTS)

Narrative

The scientific equipment was loaded onto *Clupea* on 5 and 8 September. The vessel sailed from Fraserburgh at 0900 hours on 10 September calling in at Aberdeen where Scientific staff joined the ship at 1330 hours. *Clupea* then sailed for the southern edge of the study area and anchored off Dunbar for the night.

Acoustic and top predator survey work was carried out during daylight hours (between 0630 and 1830 hours) over the next three days (11-13 September). The density of seabirds, seals and cetaceans was assessed using standard survey methods. Figure 1A shows the acoustic survey track and indicates the sections of cruise track where top predator census data were collected. The southern transects were surveyed first, finishing up at the north of the study area. In addition to the formal top predator survey, all casual sightings of seals and cetaceans were also noted. Strong westerly winds on 12 and 13 September prevented seabird and marine mammal

survey on the transects steamed in a westward direction while the vessel was beyond any shelter offered by the land, more than approximately 10 NM offshore. Concentrations of pelagic fish were sampled using an International Young Gadoid Pelagic trawl (PT154) with 6 mm mesh size cod-end. The scarcity of shoals of pelagic fish resulted in only two pelagic trawl samples being taken. The positions of these hauls are also shown in Figure 1A. Samples of fish from each haul were measured to determine length frequency distributions following standard procedures. Otolith samples were collected from sandeels, herring and sprats, and fish were weighed to determine length-weight relationships.

Acoustic and top predator survey work was completed by the early evening of 13 September and *Clupea* sailed into Dundee to change over fishing gears; the pelagic gear was replaced by a demersal Jackson Rockhopper trawl with a 10 mm meshsize cod-end. Eric Armstrong left the boat to be replaced by John Donald. Work was completed by late morning of 14 September and *Clupea* sailed at 1130 hours. Two demersal fishing stations were fished on route for anchorage off St Abb's Head. The following day gale force winds prevented the vessel from sailing until after mid-day. One demersal station was fished in very poor conditions and *Clupea* then anchored off Dunbar. Five stations were fished during each of the next two days. On the night of 17 September *Clupea* lay offshore on station enabling the remaining two demersal fishing stations to be sampled before having to depart the study area. The locations of these demersal trawl stations are shown in Figure 1B.

A Day grab was used to collect sediment samples in order to groundtruth the RoxAnn maps and a Seabird CTD instrument was used to examine vertical and horizontal variation in water temperature and salinity. These samplers were deployed immediately preceding and immediately following each demersal trawling operation (Figure 1C). Sediment sample locations where sandeels were trapped in the Day grab are indicated.

Survey work ceased at 0930 hours on 18 September and *Clupea* sailed for Fraserburgh where she arrived at 1800 hours. The scientific equipment was off loaded and scientific staff left the ship on the morning of 19 September.

S Greenstreet
30 September 1997

Seen in draft: A Simpson, OIC

Fig. 1A: Acoustic survey track steamed in september 1997, showing mid-point locations of five minute survey periods. Filled points indicate sample periods where seabird survey was also undertaken. Pelagic haul positions are indicated by square symbols and haul number is given.

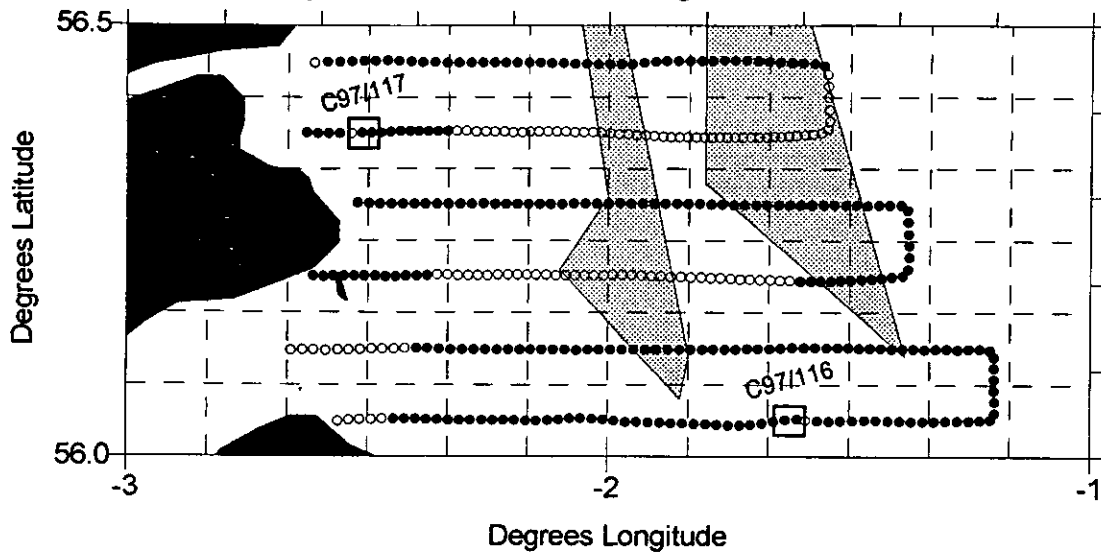


Fig. 1B: Chart showing locations of the 15 demersal trawl stations sampled in September 1997.

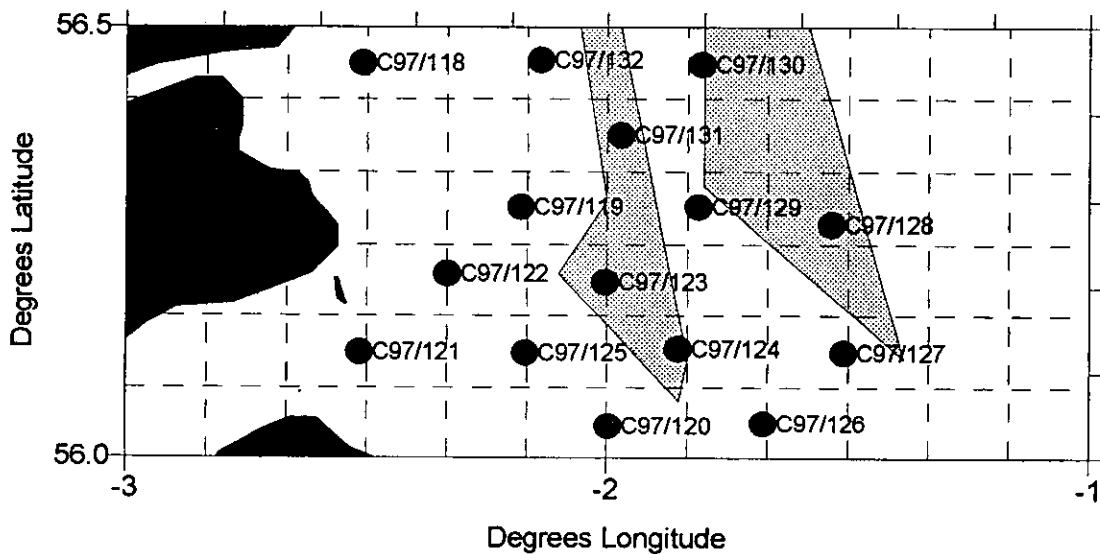


Fig. 1C: Chart showing locations where sediment samples (boxes) and CTD data (triangles) were collected in September 1997. Grab samples where sandeels were trapped are indicated.

