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FRV *Clupea*  
Cruise 3/90 part 2

3pt2CR90

Report  
19-26 March 1990

### Personnel

P W Balls	SSO (in charge)
M R Robertson	HSO (19-21 March)
R Laslett (Miss)	(PhD Student)
F Muller	(Visitor - Southampton University)
M Tranter	(Visitor - Southampton University)

### Objectives

To collect samples of water, suspended particulate matter and sediment from the Clyde estuary, Inner and Outer Firths of Clyde and the North Channel.

### Narrative

Scientific staff joined *Clupea* at Ardrossan during the afternoon of the half landing on 19 March. During the period 20-22 March, strong winds limited sampling to the inner stations (1-5). With *Clupea* based at Greenock, these stations were all sampled for water; in addition, sediment cores were obtained from two. On 22 March the Clyde estuary was surveyed to the limit of navigation at the Garden Festival bridge.

Severe gales during the 23 and 24 March ruled out sampling in the Outer Firth and severely limited operations in the Inner Firth. After the vessel successfully obtained cores from station 3, a sick crew member left the ship in Greenock in the late morning of 23 March and *Clupea* remained there for the rest of the day. On 24 March, *Clupea* proceeded to Rothesay, one core being obtained at station 2 on route.

The weather moderated on 25 March and an extended working day enabled stations 6, 7, 8 and 9 to be sampled for water, while, in addition, cores were obtained from stations 5 and 6. *Clupea* docked in Ardrossan in the evening and scientific staff left the following morning.

### Results

Most of the samples await analysis, but on board results indicate that the high nutrient concentrations associated with the estuary are not detectable beyond station 6. Sediment cores from the Inner Firth were generally oxic and contain burrowing animals. By contrast, the core obtained from station 1 had an anoxic layer close to the surface. Pore water analysis will be used to estimate the diffusive flux of metals from the sediments to the water column.

P W Balls

4 April 1990