R1/6

Not to be cited without prior reference to the Marine Laboratory, Aberdeen

FRV *Clupea*

Cruise 0998C

REPORT

29 May - 8 June 1998

Personnel:

I M Davies	PSO (in charge)		
P Copland	HSO		
P Hayes	PhD Student		
M D Krom	Visitor	Leeds Univ	30 May-2 June
R Mortimer	Visitor	Leeds Univ	30 May-2 June
D Helland	Visitor	Leeds Univ	30 May-2 June
J Feldmann	Visitor	Aberdeen Univ	30 May-2 June (Living on shore)
P Pengprecha	Visitor	Aberdeen Univ	30 May-2 June
R Harrison	Visitor	Leeds Univ	2 June-6 June
A Morgan	Visitor	Leeds Univ	2 June-6 June
M Bailey	Visitor	Leeds Univ	2 June-6 June

Out-turn days per project: AE10n-4, BGMI-7

Narrative

Clupea was loaded at Fraserburgh on 29 May. Staff from MLA joined and *Clupea* sailed at 1300 hours for the west coast. *Clupea* arrived off Loch Torridon on the morning of 30 May and a surface sediment grab survey of outer Loch Torridon was completed and *Clupea* made passage to Kyle of Lochalsh. Visitors from Aberdeen and Leeds Universities joined the vessel at Kyle during the evening of 30 May.

Sediment survey work was undertaken in Loch Duich from 31 May - 2 June using box corer and Day grab in collaboration with MHM Letterfearn fish farm staff. Sediment samples were processed for the investigation of nitrogen cycling processes in natural sediments and in sediments affected by fish farm waste. Analyses will be carried out in Leeds University (gel probe pore water samplers), MLA, and Aberdeen University (sediment microbiology). Additional sediment samples were also processed anaerobically to provide pore water and sediment samples for investigation of arsenic speciation in anaerobic marine sediments by Aberdeen University. Supporting analyses will be carried out by MLA and Leeds University.

Aberdeen University staff left *Clupea* at Kyle of Lochalsh on the morning of 2 June, and the Leeds University staff left in the afternoon of 2 June. Further visitors arrived from Leeds University on the evening of 2 June.

The ship undertook engine repairs in Kyle of Lochalsh during the night of 2-3 June and sailed to Gairloch early in the morning of 3 June where P Copland joined the ship. From 3 June to 5 June, a series of RoxAnn and sea bed surveys were carried out in outer Loch Torridon, Loch Shieldaig and inner Loch Torridon. Particular attention as paid to the area around the MHM fish

farm in Loch Diabaig. Previous contact had been made with the farm manager who offered assistance with sediment sampling. The weather was sufficiently good that all sampling was carried out from *Clupea*.

After completion of the surveys, *Clupea* made passage to Gairloch where P Copland and two Leeds University staff left the vessel on the morning of 6 June. *Clupea* then made passage to Fraserburgh and docked on 7 June. The remaining scientists left the vessel on 8 June and the unloading of equipment was started on 8 June and completed later in the week.

Results

The majority of the samples await analysis in the various laboratories involved in the cruise. The pore water chemistry (as indicated by sulphide measurements) was broadly similar at the deep stations in Loch Duich as had been found previously and therefore should provide a sound basis for the new investigations related to nitrogen cycling and arsenic speciation.

The RoxAnn surveys of the Loch Torridon system indicated considerable variability in the bottom sediment type, reflecting bottom topography and degree of exposure. It was noted that in some areas of soft mud bottom the E1 RoxAnn echo was more characteristic of a hard bottom than of mud. A series of sediment samples were collected to attempt to elucidate why this was the case.

Sampling round the fish farm in Loch Diabaig indicated that a considerable area of the sea bed in the loch had been affected by waste from the fish farm. It has been necessary at times in the past to move the cages away from areas of heavily impacted sea bed. Redox profiles suggest that the effect of waste from the farm can be detected not only in the immediate area of the farm but up to 1,500 m away from the farm. Further analyses should indicate whether this is supported by organic carbon etc concentrations.

Ian M Davies
26 June 1998

Seen in draft: A Simpson, OIC