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

FRV *Clupea*

Cruise 0796C

REPORT

26 April - 17 May 1996

Ports

Loading:	Fraserburgh
Unloading:	Ardrossan
Working:	Ardrossan 28/29 April; Douglas 8 May
Half-landing:	Douglas 9/10 May

Personnel

D Saward	SSO	26 April - 17 May (in charge)
R Payne	HSO	26-29 April
E Armstrong	SO	26 April - 10 May
I Garioch	Res Asst	26 April - 10 May
L Goodwin	SO	28 April - 17 May
J McKie	HSO	9-17 May
C Shand	HSO	9-17 May

Fishing Gear

BT116 *Clupea* wing trawl

Objectives

1. To recover a current meter mooring from the North Channel, deployed during FRV *Clupea* Cruise 0596C.

2. To map the seabed bathymetry and sediment types in the Beaufort's Dyke explosives disposal site, and in adjacent areas in the North Channel, Firth of Clyde and Irish Sea, using RoxAnn©.

3. To undertake a side-scan sonar survey of the area described in Objective 2, to determine the distribution of man-made debris on the surface of the sea bed.

4. To undertake a magnetometer survey of the area described in Objective 2, to complement the side-scan sonar investigations.

5. To collect seabed sediment samples from selected locations within the area described in Objective 2, and from dredge spoil disposal sites in the North Channel and Irish Sea, for particle size, chemical and biological analyses.

6. To undertake underwater television studies in the vicinity of the current meter mooring location, to confirm the suitability of the area for the establishment of a dredge spoil disposal site.

7. To undertake underwater television studies at selected near-shore locations within the area described in Objective 2, to complement the side-scan sonar investigations.

8. To undertake a trawl survey in the vicinity of the current meter mooring location, to confirm the suitability of the area for the establishment of a dredge spoil disposal site and collect samples of representative species for chemical analysis.

9. To undertake trawl surveys at three locations in the Irish Sea, to collect samples of representative species for chemical analysis.

Out-turn Days Per Project: 20 days, BEAZ; 2 days, BEB1

Narrative

Scientific staff joined the vessel at Fraserburgh on 26 April, and completed loading operations. Scientific equipment was set up prior to departure. The vessel departed Fraserburgh during the afternoon of 26 April, as soon as the tide was suitable, to proceed to the North Channel. Weather conditions deteriorated during passage, and it was necessary to shelter in Loch Eriboll before proceeding around Cape Wrath. The vessel arrived at the North Channel current meter mooring location during the evening of 28 April, and the mooring was recovered. The vessel then proceeded to Ardrossan to unload the mooring. L Goodwin joined the vessel on 28 April, and R Payne disembarked on 29 April. The vessel departed Ardrossan during the morning of 29 April to return to the survey area. Upon arrival, the RoxAnn©, side-scan sonar and magnetometer surveys outlined in Objectives 2, 3 and 4 were commenced immediately. At 1400 hours on 1 May, the magnetometer survey was suspended for approximately 24 hours, because very poor weather conditions had led to the magnetometer cable fouling the side-scan sonar cable. At 2345 hours on 2 May, all survey operations were suspended for approximately three hours, to repair the side-scan sonar winch. At 1700 hours on 4 May, the RoxAnn© survey was suspended for approximately 65 hours, to investigate a fault in the equipment hardware. The side-scan sonar survey was completed during the early morning of 7 May 1996, and the grab survey outlined in Objective 5 was commenced. The RoxAnn© survey was recommenced during the grab survey, following correction of the hardware fault. On 7 May, the vessel ran out of freshwater, and survey operations were suspended during the early morning of 8 May to allow the vessel to proceed to Douglas. Apart from the short interruption on 2/3 May, survey operations had been continuous between 1400 hours on 29 April and 0100 hours on 8 May, and it is appropriate to thank the Skipper, Mate and crew for their flexibility and cooperation during that period. The vessel remained at Douglas from 0330 hours on 8 May until 0945 hours on 10 May, to await replacement staff and complete the scheduled half-landing. During that period, the side-scan sonar winch was decommissioned and unloaded, and the net drum was installed. J McKie and C Shand joined the vessel on 9 May, and E Armstrong and I Garioch disembarked on 10 May. During the morning of 10 May, the vessel returned to the survey area to complete the RoxAnn©, magnetometer, grab sampling, trawl sampling and underwater television surveys outlined in Objectives 2, 4, 5, 6, 7, 8 and 9. To complete the work programme, it was necessary to alternate between the objectives, and to resume continuous survey operations until 2115 hours on 12 May. Again, it is appropriate to thank the Skipper, Mate and crew for

their assistance. Following completion of the Irish Sea trawl surveys on 12 May, operations continued on a daily basis until mid-day on 16 May. The vessel then proceeded to Ardrossan, berthing during the afternoon of 16 May. Unloading was completed during the morning of 17 May, and scientific staff disembarked to return to Aberdeen.

Results

1. The current meter mooring off Corsewall Point, in the North Channel, was recovered and returned to the Marine Laboratory, Aberdeen.

2. The RoxAnn© survey of the Beaufort's Dyke explosives disposal site, and adjacent areas in the North Channel, Firth of Clyde and Irish Sea, was completed. Transect line spacing in the Beaufort's Dyke explosives disposal site, the North Channel and the Firth of Clyde was approximately 1 km. Transect line spacing in the Irish Sea had to be increased to approximately 2 km, because of time lost as a result of the RoxAnn© hardware fault. Adequate coverage was obtained throughout the survey area, and a seabed sediment map was produced to support the grab sampling programme. The map will be refined at the Marine Laboratory, Aberdeen, incorporating particle size analysis data.

3. The side-scan sonar survey of the Beaufort's Dyke explosives disposal site, and adjacent areas in the North Channel, Firth of Clyde and Irish Sea, was completed. Transect line spacing throughout the survey area was approximately 1 km. Acceptable resolution was obtained in water depths of less than approximately 175 metres. Detailed analysis of the side-scan sonar data will be undertaken at the Marine Laboratory, Aberdeen.

4. The magnetometer survey of the Beaufort's Dyke explosives disposal site, and adjacent areas in the North Channel, and Irish Sea, was partially completed. Bad weather prevented completion of all the survey transects within the Beaufort's Dyke explosives disposal site, but this was a low priority survey area. Transect line spacing throughout the remainder of the survey area was approximately 1 km. It was not possible to obtain any magnetometer coverage in the Firth of Clyde, at the entrance to Loch Ryan, and this area will be surveyed during FRV *Clupea* Cruise 1396C. Preliminary analysis of the data indicated that the towed magnetometer was able to detect large concentrations of ferromagnetic debris. Detailed analysis of the magnetometer data will be undertaken at the Marine Laboratory, Aberdeen.

5. Sixty nine grab sampling stations were occupied in the Beaufort's Dyke explosives disposal site, and adjacent areas in the North Channel, Firth of Clyde and Irish Sea. An additional 15 sampling stations were occupied at the Burrow Head and Portpatrick dredge spoil disposal sites. A total of 186 Day grab deployments were undertaken. Seventy four seabed sediment samples were collected for particle size analysis; 66 samples were collected for chemical analysis; and 16 samples were collected for biological analysis. The particle size and chemical samples were deep frozen. The biological samples were preserved in 5% formalin. Particle size, heavy metal and macrobenthic infauna analyses will be undertaken at the Marine Laboratory, Aberdeen.

6. Two sites in the vicinity of the current meter mooring location were investigated using the drop-frame underwater television system. Underwater visibility was poor

at one of the sites, but it was nevertheless possible to obtain acceptable quality video records. Detailed analysis of the underwater television records will be undertaken at the Marine Laboratory, Aberdeen.

7. Twenty seven coastal sites in the North Channel, Firth of Clyde and Irish Sea were investigated using the drop-frame underwater television system. The sites investigated were unlikely to be suitable for investigation using the towed sledge underwater television system, because of the nature of the sea bed. The sites included a number of boulder fields, and areas where the sea bed was predominantly bedrock. Underwater visibility was extremely variable, depending upon the location of the site, the nature of the sea bed and the state of the tide. It was nevertheless possible to obtain acceptable quality video records at most of the sites. Comparatively small amounts of munitions-related debris were observed in coastal areas adjacent to the northern sector of the Beaufort's Dyke explosives disposal site. Detailed analysis of the underwater television records will be undertaken at the Marine Laboratory, Aberdeen.

8. A single trawl was undertaken in the vicinity of the current meter mooring location. Sufficient material was caught to obtain samples of cod, haddock, plaice, spotted dogfish and *Nephrops* for chemical analysis. Flesh and, where appropriate, liver samples were taken from individual fish, and deep frozen for chemical analysis. A pooled tail-flesh sample was taken from 25 *Nephrops*, and deep frozen for chemical analysis. Heavy metal analyses will be undertaken at the Marine Laboratory, Aberdeen.

9. A total of four trawls were undertaken in three areas in the Irish Sea. The first area was to the west of the Isle of Man; the second area was at the southern end of the Beaufort's Dyke explosives disposal site; and the third area was to the north of the Isle of Man. Sufficient material was caught in all three areas to obtain separate samples of representative species for chemical analysis. Samples of cod, whiting, ling and *Nephrops* were obtained from the first area. Samples of cod, haddock, whiting and spotted dogfish were obtained from the second area. Samples of cod, whiting, lemon sole, plaice, herring and spotted dogfish were obtained from the third area. Flesh and, where appropriate, liver samples were taken from individual fish, and deep frozen for chemical analysis. A pooled tail-flesh sample was taken from 25 *Nephrops*, and deep frozen for chemical analysis. Heavy metal analyses will be undertaken at the Marine Laboratory, Aberdeen.

Derek Saward
12 September 1996

Seen in draft: A Simpson