

R1/6

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

FRV *Clupea*

Cruise 0495C

REPORT

28 February - 17 March 1995

Ports

Loading: Tarbert
Unloading: Fraserburgh

Personnel

D Saward SSO 28 February - 17 March (in charge)
J McKie HSO 28 February - 17 March
L Goodwin SO 28 February - 17 March
S Forsyth SO 3-9 March

Fishing Gear: BT116 *Clupea* wing trawl

Out-turn days per project: 18 days, BEA1

Objectives

1. To collect sea water samples from the Garroch Head sewage disposal site, and from areas adjacent to the disposal site, the microbiological analysis on FRV *Clupea*.
2. To collect sea water samples from the Garroch Head sewage sludge disposal site, and from areas adjacent to the disposal site, for measurement of suspended solid levels in the Marine Laboratory, Aberdeen.
3. To collect seabed sediment samples from the Garroch Head sewage sludge disposal site, and from areas adjacent to the disposal site, for microbiological analysis on FRV *Clupea*.
4. To collect seabed sediment samples from the Garroch Head sewage disposal site, and from areas adjacent to the disposal site, for chemical analysis in the Marine Laboratory, Aberdeen.
5. To undertake a trawl survey at the Garroch Head sewage sludge disposal site, and at locations adjacent to the disposal site, to collect samples of representative species for chemical analysis in the Marine Laboratory, Aberdeen.
6. To collect sea water samples from the Wide Firth, Bay of Kirkwall and adjacent areas off the Orkney Isles, for microbiological analysis on FRV *Clupea*.
7. To collect seabed sediment samples from the Wide Firth, Bay of Kirkwall and adjacent areas off the Orkney Isles, for microbiological analysis on FRV *Clupea*.
8. To collect seabed sediment samples from the Wide Firth, Bay of Kirkwall and adjacent areas off the Orkney Isles, for chemical analysis in the Marine Laboratory, Aberdeen.

9. To collect seabed sediment samples from Clift Sound and Whiteness Voe, Shetland Isles, for biological analysis in the Marine Laboratory, Aberdeen.
10. To collect seabed sediment samples from the selected dredge spoil disposal sites in coastal waters off the Western Isles, Orkney Isles and the Shetland Isles, and from selected sites in coastal waters around the Scottish mainland between the Firth of Clyde and Fraserburgh, for particle size and heavy metal analyses in the Marine Laboratory, Aberdeen.
11. To collect a supply of reference sea water off Cape Wrath, for oyster larvae bioassay experiments to be undertaken in the Marine Laboratory, Aberdeen.
12. To carry out enforcement visits under the Food and Environment Protection Act 1985 at a number of locations on the Isle of Arran.

Narrative

Scientific staff joined the vessel at Tarbert on the evening of 27 February 1995 to load additional scientific equipment. On the morning of 28 February FRV *Clupea* proceeded to selected dredged spoil disposal sites in the Firth of Clyde and Garroch Head sewage sludge disposal site to commence the sampling programmes outlined in Objectives 5 and 10. En route, scientific equipment was set up and tested. During the evening of 3 March the vessel called in at Brodick to uplift S Forsyth before returning to the Firth of Clyde/Garroch Head sampling area to resume to complete the work programme outlined in Objectives 1, 2, 3, 4, 5 and 10. On the morning of 6 March *Clupea* returned to Brodick to allow J McKie to disembark and carry out enforcement visits under the Food and Environment Protection Act 1985 at three locations on the Isle of Arran. On completion of this work, J McKie travelled to Ardrossan and rejoined *Clupea* to complete the work programme in the Firth of Clyde/Garroch Head area. During the morning of 9 March S Forsyth left the ship and returned to Aberdeen. *Clupea* then set sail for Orkney, collecting en route seabed sediment samples at selected dredge spoil disposal sites at Tayinloan, Lochinver, Kinlochbervie, Stornoway and Scrabster. A supply of reference sea water was also collected off Cape Wrath, as outlined in Objectives 10 and 11. Upon arrival in Orkney on 12 March the sea water and sediment sampling programmes outlined in Objectives 6, 7 and 8 were completed. Due to the weather conditions Objective 9 was not undertaken. Upon completion of the Orkney sampling programme *Clupea* proceeded to Fraserburgh, undertaking seabed sampling at selected dredged spoil disposal sites en route. The vessel docked in Fraserburgh during the afternoon on 16 March and unloaded on the morning of 17 March when scientific staff disembarked and returned to Aberdeen.

Results

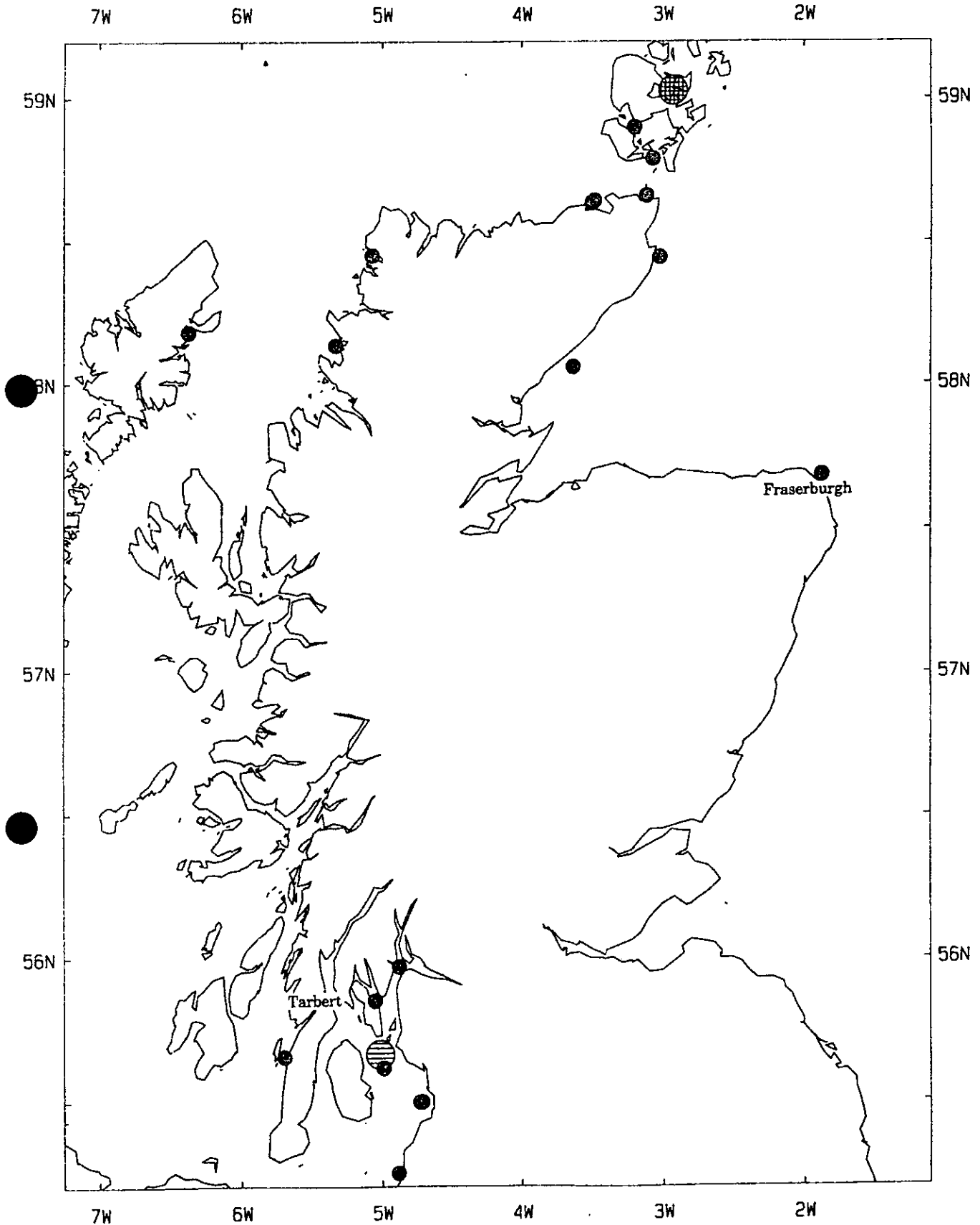
1. Sea water samples were collected from three discrete depths at 26 sampling sites at Garroch Head (including control stations), for enumeration of faecal coliform and faecal streptococci. Low numbers of bacteria were isolated from the samples.
2. Sea water samples were collected from three discrete depths at 26 sampling sites at Garroch Head (including control stations) for suspended solids measurements. Sea water samples were filtered onto membranes on board FRV *Clupea*.
3. Forty-six seabed sediment samples were collected at Garroch Head for heavy metal and particle size analysis. At each of the control sampling stations, two samples were collected for the same analyses. Heavy metal and particle size data are not, as yet, available.
4. Forty-six seabed sediment samples were collected at Garroch Head for faecal coliform, faecal streptococci and *Clostridium perfringens* spore determinations. Low numbers of bacteria were isolated from the samples.

5. At the Garroch Head sewage sludge disposal site, samples of nine fish species were collected for heavy metal analysis. Heavy metal data is not, as yet, available.
6. Sea water samples were collected from two discrete depths at 12 sampling stations in the Wide Firth, Bay of Kirkwall and adjacent areas for enumeration of faecal coliform, faecal streptococci and suspended solids measurements. Low numbers of bacteria were isolated and samples were filtered onto membranes for suspended solids on board *Clupea*.
7. Twenty-eight seabed samples were collected from the Wide Firth, Bay of Kirkwall for faecal coliform, faecal streptococci and *Clostridium perfringens* spore determinations. Low numbers of bacteria were isolated from the samples.
8. Twenty-eight seabed sediment samples were collected from the Wide Firth, Bay of Kirkwall and adjacent areas for heavy metal and particle size analysis. Heavy metal and particle size data is not, as yet available.
9. This objective was abandoned due to adverse weather conditions.
10. A total of 120 seabed sediment samples were collected from dredge spoil disposal sites in coastal waters off the Western Isles, Orkney Isles, and from selected sites around the Scottish mainland between the Firth of Clyde and Fraserburgh, for particle size and heavy metal analyses in the Marine Laboratory. Heavy metal and particle size data are not, as yet, available.
11. Reference sea water was collected off Cape Wrath, for oyster embryo bioassay experiments.
12. Three enforcement visits under the Food and Environment Protection Act 1985, were undertaken on the Isle of Arran and reports prepared for further action.

D Seward
19 September 1995

Seen in draft: A Simpson, OIC FRV *Clupea*

CRUISE 0495C - SAMPLING STATIONS



- 120 sediment samples collected for heavy metal and particle size analyses (Day Grab)
- ⊖ 46 sediment samples collected for heavy metal, microbiological and particle size analyses (Day Grab)
78 water samples collected for microbiological analyses and suspended solids measurements (Rosette Water Sampler)
Samples of representative fish species collected from 6 trawls (BT 116)
- ⊞ 28 sediment samples collected for heavy metal, microbiological and particle size analyses (Day Grab)
36 water samples collected for microbiological analyses and suspended solids measurements (Rosette Water Sampler)