R1/12

In Confidence - Not to be quoted without reference to Lab

FRV 'Scotia'

Cruise 5/81 5SR81

REPORT

20 May - 8 June

Objectives

1. To undertake monitoring surveys at Bell Rock and St Abbs Head sludge dumping grounds.
2. To carry out a neuston net survey of Bell Rock/St Andrews Bay area to observe the diurnal rhythm of lobster larvae.
3. To conduct a survey of the sea surface off the Tay and Forth estuaries to provide information for a European Space Agency experiment using airborne sensors.
4. To investigate the distribution of heavy metals and pesticides in the sediments of the sludge dumping grounds in the Firth of Forth and in the North Sea (between 56°N - 59°15'N).
5. To investigate the benthic communities in parts of the North Sea between latitudes 56°N - 59°15'N.
6. To investigate the status of the benthic communities around the Beryl production platform.

Narrative

'Scotia' sailed from Aberdeen at 18.00 hrs on Wednesday 20 May and proceeded to the Bell Rock sewage sludge dumping ground (Objective 1 and 4). The sampling was completed by 16.15 on 21 May when the ship proceeded to a position off Arbroath to start the first leg of the sea surface survey (Objective 3) which was completed by 23.00 hrs of the same day. During this survey time was spent in taking neuston samples for lobster larvae in the vicinity of St Andrews Bay (Objective 2). 'Scotia' then steamed to St Abbs Head sewage sludge dumping ground where after carrying out part of the survey (Objective 1 and 4) she proceeded to the Firth of Forth where Mr Falconer a member of the scientific personnel joined the ship by pilot boat. While in the Firth of Forth the second leg of the sea surface survey (Objective 3) was completed by 18.30 hrs on 22 May. 'Scotia' returned to St Abbs and after having completed the remaining sampling by 04.30 on 23 May she proceeded to station 61 to begin the North Sea benthic survey (Objective 4 and 5). Sampling was interrupted at station 130 on 23/24 May in order to land the chief scientist, requiring medical attention at Aberdeen. Mr Murison took charge of the cruise and 'Scotia' returned without delay to station 131 in the programme.

Weather remained good for the remainder of the first part of the cruise and with good progress being made it was possible to deviate from the original sampling plan in order to cover a substantially larger number of stations before the mid cruise break. Work was terminated at Station 77 and 'Scotia' sailed to Esbjerg where she docked at 2230 hrs on 31 May.

On 1 June Mr Helsing of the Annex Laboratory, Esbjerg visited the ship to collect plankton sampling equipment and saithe stomachs being transported from Aberdeen. On the same day Mr Tougaard of the Esbjerg Aquarium and Museum visited 'Scotia' to collect live fish and invertebrates collected during the cruise.

After a 2 hour delay to allow completion of repairs to the computer (after which Mr Naha left the ship) 'Scotia' left Esbjerg at 1300 hrs on 2 June and made a passage to station 78 where normal sampling was resumed.

The programme continued uninterrupted until 0830 hrs on 5 June (stn. 99) when 'Scotia' set course for Aberdeen in order to land a member of the ships staff for compassionate reasons. Transfer took place by pilot boat and the ship returned to station 140 arriving at 2230 hrs on the same day.

The remaining work in Objective 5 ended on the morning of 7 June with the sampling of stations A to E on the JONSIS line where continuous recording of temperature and salinity was additionally carried out.

'Scotia' then proceeded to the vicinity of Beryl oilfield where with the co-operation of the platform management benthic sampling was carried out at the four positions indicated in this station list. At 2300 hrs on 7 June 'Scotia' left the area on passage to Aberdeen (A brief stop at station 100 allowed completion of the benthic sampling programme) where she docked at 1730 hrs on 8 June.

Results

Objective 1

Eighteen stations were sampled for macrobenthos, meiobenthos and sediment for particle size, carbon content, heavy metals and organic pesticide residues. In addition ten of these stations were selected for assessment of epibenthos using A gassiz trawl and underwater television. Craib corer samples were collected at six stations on the St Abbs Head ground for measurement of Eh/pH profiles. Preliminary observations gave no evidence of accumulation of organic matter on the Bell Rock ground, though sediments near the centre of the St Abbs Head ground were dark and smelt of hydrogen sulphide. This condition was not observed in Craib cores taken at the same stations and in which redox potentials were measured Negative potentials were not recorded in any core.

Objective 2

Neuston net samples were collected in the relevant area and these will be examined for presence of lobster larvae.

Objective 3

Zig-zag surveys were conducted in both the Firth of Forth and Firth of Tay areas. Continuous monitoring of salinity, temperature, chlorophyll and water particle content was carried out along with sea surface photography and observations on wave height. These data require further analysis

Objective 4

Sediment samples (upper 1-2 cm) for heavy metal and pesticide analysis were collected at all grabbing stations occupied during the cruise. These will be analysed in due course.

Objective 5

A total of 90 stations was sampled by 1/10 m^2 Smith-McIntyre grab for macrobenthos, meiobenthos, sediment particle size and organic carbon, heavy metal and organic pesticide residues. At 54 stations Craib cores were collected for measurement of Eh/pH profiles. These samples were later preserved and retained for meiobenthos studies. The epibenthos was assessed by Agassing trawl and underwater television. A GOV trawl was used at three stations to collect fish for stomach analysis and heavy metal and pesticide residues.

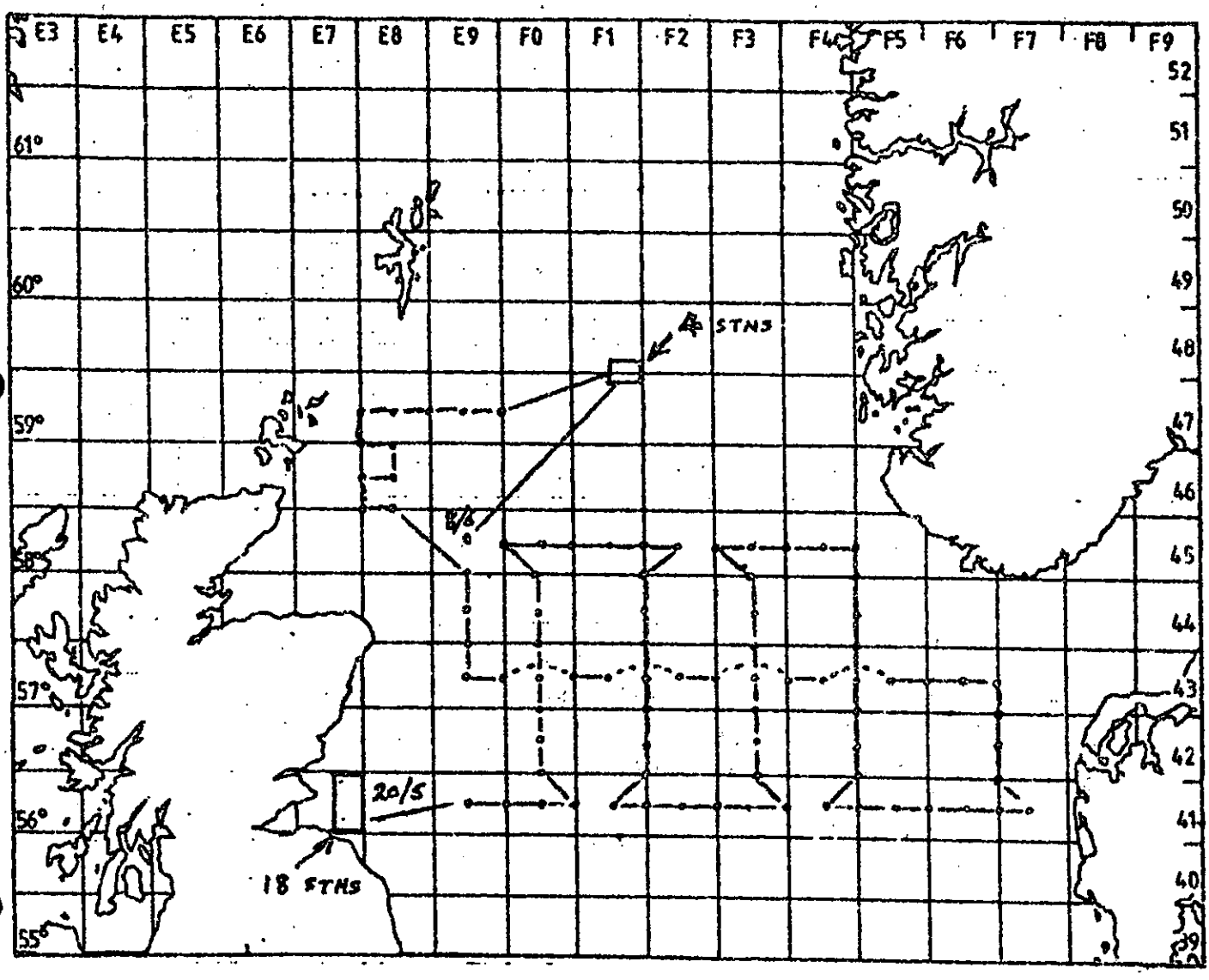
Preliminary examination of epifaunal samples indicates a highly variable community structure reflecting, perhaps, the wide range of bottom sediments encountered.

Objective 6

Four stations were sampled using the methods outlined above. Sampling difficulties were experienced at two of these due to stony bottom deposits. Examination of infauna samples will be necessary in order to assess the status of the benthic community.

An Eleftheriou
D J Murison
18 June, 1981

Seen in draft J W Gillon



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