

In Confidence: Not to be quoted without reference to the laboratory

#### CRUISE REPORT

FRV "CLUPEA"

11-15 APRIL 1977

#### Objectives:

- a) To estimate particle size, precipitation rate and horizontal spread of sewage sludge at the Garroch Head sludge dumping ground.
- b) To catch fish on the dumping ground for microbiological analysis.
- c) To sample stations on and around the sludge dumping ground for various biological, chemical and physical factors.

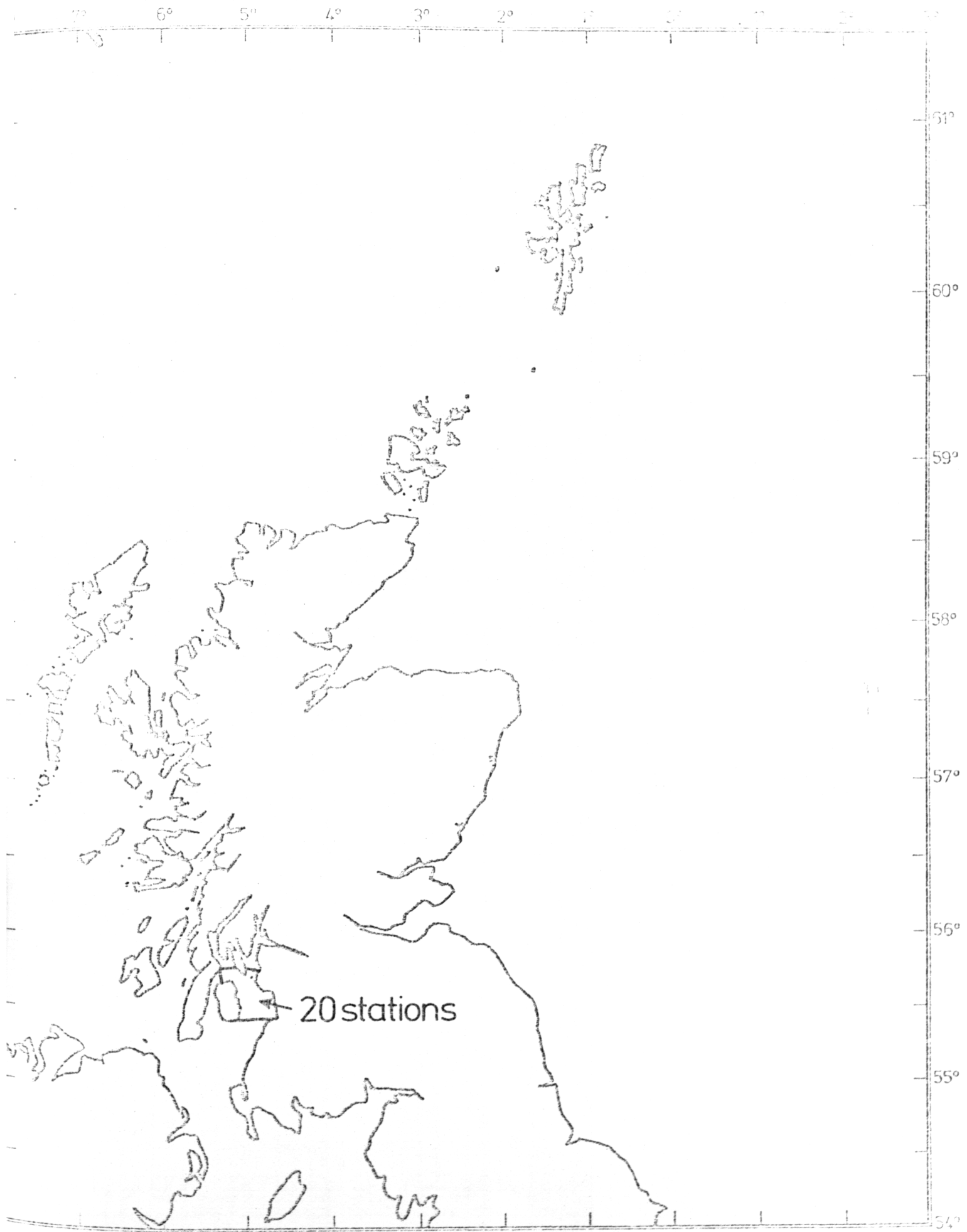
#### Narrative:

Scientific staff joined "Clupea" on 10 April in Campbeltown. Work commenced the following morning on the east side of Arran where samples were taken for chemical, biological and physical parameters. Hand-line fishing was also undertaken in the same area. Sampling and fishing were then continued on the Garroch Head sludge dump ground until ca 1100 hrs on Tuesday when sampling of the sewage sludge was started. Upon completion of this section of the work the last stations of the biological/chemical grid were taken. Due to inclement weather "Clupea" docked at Campbeltown where scientific staff disembarked on Wednesday, 13 April, returning to Aberdeen by public transport. "Clupea" arrived in Aberdeen on Friday, 15 April, where offloading took place.

#### Results:

- a) Water samples were collected on the dumping ground (at 5 m, 15 m, 30 m, 50 m & bottom) 1 hour before, at, and 1, 2 and 4 hrs after dumping. The particle range and concentration of the water samples were measured with a Coulter Counter using both 140  $\mu$  and 280  $\mu$  apertures, detecting a particle size range from 2.5  $\mu$  to 128  $\mu$  diameter. Pre-dump data revealed that the phytoplankton was in a pre-bloom situation with generally low particle concentrations. Samples taken immediately after dumping showed a massive overall increase in total particulates, the 5 m sample particulate volume increasing fifteen fold. A return to the normal situation was accomplished by the time the final samples were taken (4 hrs after dumping). There was no measured increase in total mercury concentration in the water column following the dumping of the sewage sludge. The use of the ship's echosounder and a transmissometer proved unsuitable in measuring the extent of the sewage spread, detectable changes being measured only immediately on dumping.
- b) No fish samples were taken, despite many hours fishing.
- c) Various stations were sampled with Van Veen grab and gravity corer for biological and chemical analyses and sediment assessment. It appears that the area of the spoil ground has changed very little since the previous survey in 1971. Gravity core measurements revealed that the extent of the black layer in the sediment ranged in depth from 54 cm at the centre of the spoil ground to 15 cm on the edge of the ground.

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29 June 1977



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