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IN CONFIDENCE: Not to be quoted without prior reference to the laboratory.

FRV 'Clupea'

2 and 1p +1CR84

Cruise 2/84 9-23 February and

Cruise 3/84 Part I 28 February - 16 March

REPORT

Objectives

- 1) To examine the fishing performance of PT163 and PT154 in shallow and confined areas in relation to catching adult herring.
- 2) To carry out a series of larval surveys on Ballantrae Bank and in adjacent areas in order to estimate larval production from these spawning grounds.
- 3) To carry out echointegration surveys of the South Arran and Ballantrae Bank areas in an attempt to quantify spawning aggregations of herring in these areas.
- 4) To collect herring gonads in Gibson's Fluid for fecundity analysis, to collect mature herring for morphometric analysis and to collect herring larvae and store them in liquid nitrogen for genetic analysis.

Narrative

Cruise 2/84

"Clupea" left Buckie on 9 February and made passage to Campbeltown where on 11 February fishing trials were carried out using PT163, and the echointegration system was calibrated. The following day "Clupea" proceeded to the upper Clyde and on 13 February fishing trials were carried out with both PT154 and PT163. These trials took place in the confined waters of Loch Striven. On 14 and 15 February metre net and echointegrator surveys were carried out over Ballantrae Bank and south of Arran before "Clupea" proceeded to Campbeltown for a half landing on 16 February. 17 February was spent echointegrating and trawling in the southern portion of Kilbrannon Sound but further work in this area was abandoned because of deteriorating weather conditions and "Clupea" was confined to Campbeltown on 19 and 20 February. On 21 February bad weather continued, but "Clupea" crossed to Troon to unload a computer and to change staff. On 22 February a metre net survey was carried out over Ballantrae Bank before "Clupea" returned to Greenock at the end of the cruise.

Cruise 3/84 Part I

"Clupea" left Greenock on 28 February and over the next two days completed a metre net survey on Ballantrae Bank and continued a very intensive acoustic survey both in daylight and in darkness of the entire area off the east side of Arran. On 2 March bad weather precluded work and "Clupea" made for Campbeltown in order to get the sonar repaired. Between 3 March and 5 March "Clupea" completed further metre net surveys at Ballantrae and at South Arran and further echointegration surveys to the south-west of Arran. The 6 March was spent at Troon as a half-landing, and over the next two days an acoustic survey in the Ballantrae Bank area, a metre net survey in the south Arran area and trawling in both areas was carried out. On 9 March "Clupea" initiated an echosearch in the deep water to the south of Arran, but later went to the assistance of RV "Calanus" because of an engine breakdown and towed "Calanus" back to Campbeltown. The following day, a metre net survey was carried out on Ballantrae Bank and on 11 March trawling was carried out on Ballantrae Bank with a bottom trawl on loan from RV "Calanus". Samples of both mature and immature herring were taken with this gear. In order to obtain material for the Loch Ewe bag experiment, P McLachlan joined "Clupea" during this period, as RV "Calanus" was unable to operate. On the evening of 12 March "Clupea" made for Troon for a half-landing, and the following day changed over the trawl gear to

BT116 which was used on the penultimate day of the cruise when a good catch of spawning herring was taken on Ballantrae Bank. On 15 March, the final day of Part I of the cruise "Clupea" completed a final metre net survey on Ballantrae Bank and further acoustic work en route for Troon.

Results

Gear trials

Gear trials were carried out in shallow water and in areas of restricted sea room with both PT154 and PT163 and it was found possible to shoot and haul both these gears without bottom fouling in depths of upwards of 20 fathoms of water. In extremely shallow water it is suggested that in future 15 fathom sweeps be substituted for the 30 fathoms sweeps currently in use. Herring, both adult and juvenile, were caught in small numbers during these trials.

Echointegration and trawling

Despite extensive acoustic search operations both in daylight and in darkness, few identifiable herring marks were observed in the lower Clyde area during these cruises. In lower Kilbrannon Sound herring in maturity stage 4, with a small proportion (10%) in maturity stage 7, were caught in daylight, on the bottom, at depths of 70-80 metres in mid-February. Apart from the herring in this area few mature herring were caught elsewhere until a few days prior to the end of the second cruise by which time herring were found on Ballantrae Bank but were absent from the lower Kilbrannan Sound area. Spawning herring were found on Ballantrae Bank from 6 March until the end of the cruise; but although several dense but confined echotraces were observed in the area of the "bank", and although one good trawl haul of over 40 baskets of spawning herring was taken there on 14 March, no major concentrations of herring were observed.

Larval sampling

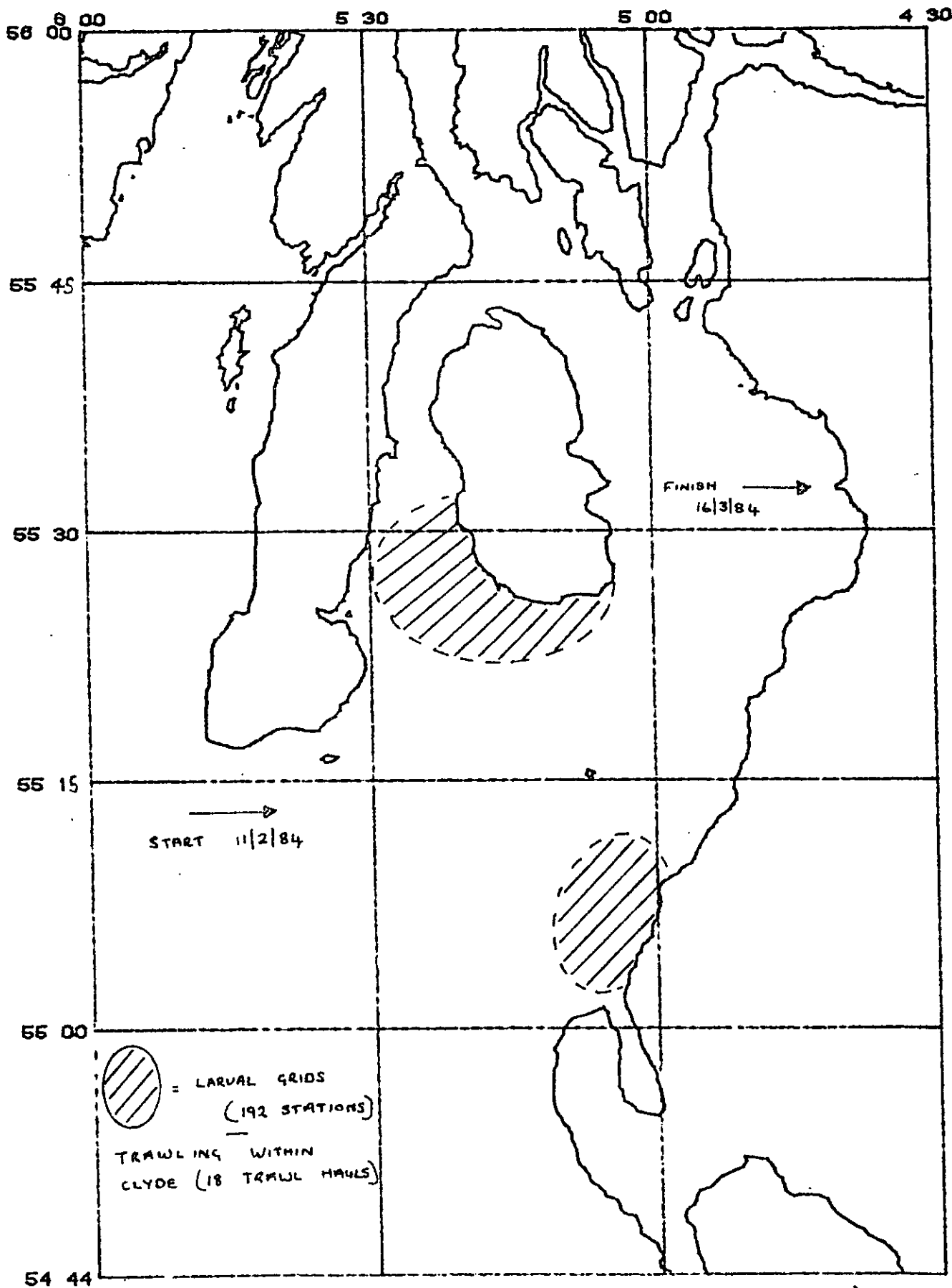
A total of 192 metre net hauls were carried out during these surveys on grids covering both Ballantrae Bank and south Arran. These grids were repeated at intervals of several days, but despite the widespread sampling both in space and in time, subsequent checking revealed that no herring larvae were present in these samples. It seems clear that minimal spawning had taken place in the lower Clyde between the beginning of February and the first week of March.

Other sampling

In addition to sampling for length, age and maturity stage herring for samples of morphometric and fecundity work were taken during this cruise. In addition herring and gadoid eggs were collected and fertilised for the "Loch Ewe" experiments. A new length-weight relationship was also prepared for Clyde herring using the computerised weighing system.

J A Morrison
24/04/84

W Smith 11/05/84



CLUPEA 2/84 and 3/84 (Part I)

11/2/84 — 16/3/84