

R1/6

In Confidence: Not to be quoted without prior reference to the Laboratory

FRV CLUPEA
Cruise 7/80
REPORT

7CR80
AR

5 August - 4 September 1980

Objectives

1. To carry out an echo integrator survey of the North Minch for mackerel.
2. To carry out a sonar survey in the same area.
3. To identify echo traces with handlines.
4. To test computer-based acoustic equipment.

Narrative

Scientists and crew joined CLUPEA in Buckie on 5 August and sailed that afternoon. The ship docked briefly in Stornoway the following day to pick up a set of moorings before proceeding to Ullapool, which was reached that evening. During the remainder of the week the moorings were laid for a DAFS inspectorate launch, a calibration was carried out in Loch Broom and a first echo integration survey was completed by mid-day on 9 August. The first survey grid covered the southern part of the total survey area, shown in Figure 1, as far north as the Butt of Lewis.

During the following week two more survey grids were completed and a second acoustic calibration was carried out in Loch Inchar on the night of 14 August. The first of these grids covered the whole of the survey area north of Ullapool while the second covered a strip extending to between 5 and 10 miles off the mainland coast from Ullapool to Loch Eriboll.

In the third week a fourth survey grid was commenced on 18 August but by early on 19 August the weather was too bad to continue and CLUPEA headed for an anchorage in Broad Bay where a third calibration was made. The fourth grid covered the survey area south of Ullapool and the western half of the North Minch as far north as $58^{\circ}23'N$. By the morning of 20 August it became apparent that no immediate moderation of the wind could be expected and CLUPEA returned to Stornoway later the same day to dock for the mid-cruise break.

Scientists and crew rejoined CLUPEA around mid-day on 26 August and during the remainder of the week two further grids were completed. The first of these covered the southern part of the survey area south of Ullapool and a five mile coastal strip from Ullapool to Cape Wrath while the second covered a five mile strip from Ullapool to Loch Eriboll.

During the last week a seventh and final survey was carried out over a 5 to 10 mile coastal strip from Ullapool to Kyle of Tongue and an acoustic calibration was made on 2 September in Loch Eriboll. The survey was completed on the morning of 4 September when CLUPEA set sail for Buckie.

During the cruise, hand line fishing was carried out at 40 locations.

Results

The identification of mackerel echo-traces improved with experience gained during the cruise. Mackerel shoals gave echo traces of rather characteristic appearance (Figure 2) which yielded very low echo integrator readings in relation to their physical size when compared, for example, with those from herring or gadoids.

Up to the mid-cruise break very few mackerel traces were seen. The first trace was located in the mouth of Loch Eriboll on 13 August while smaller traces were observed between 15 and 16 August off Loch Eriboll, Loch Inchar and Stoer.

After the mid-cruise break mackerel traces were encountered on each of the 3 grids carried out and in greater numbers. On 27-28 August concentrations was found in an area $3\frac{1}{2}$ miles by 1 mile in shallow water off Scourie, while a smaller patch was found off Loch Inchar. On 29 August traces were seen in shallow water scattered over an area from Scourie to Loch Eriboll, while on 2-3 September traces covered roughly the same area but were found to be more abundant along the north coast than further south.

Throughout the cruise the main concentrations of mackerel were extremely localised being largely restricted to waters north of Coigach Point, in depths of less than 50 metres and never more than 5 miles offshore.

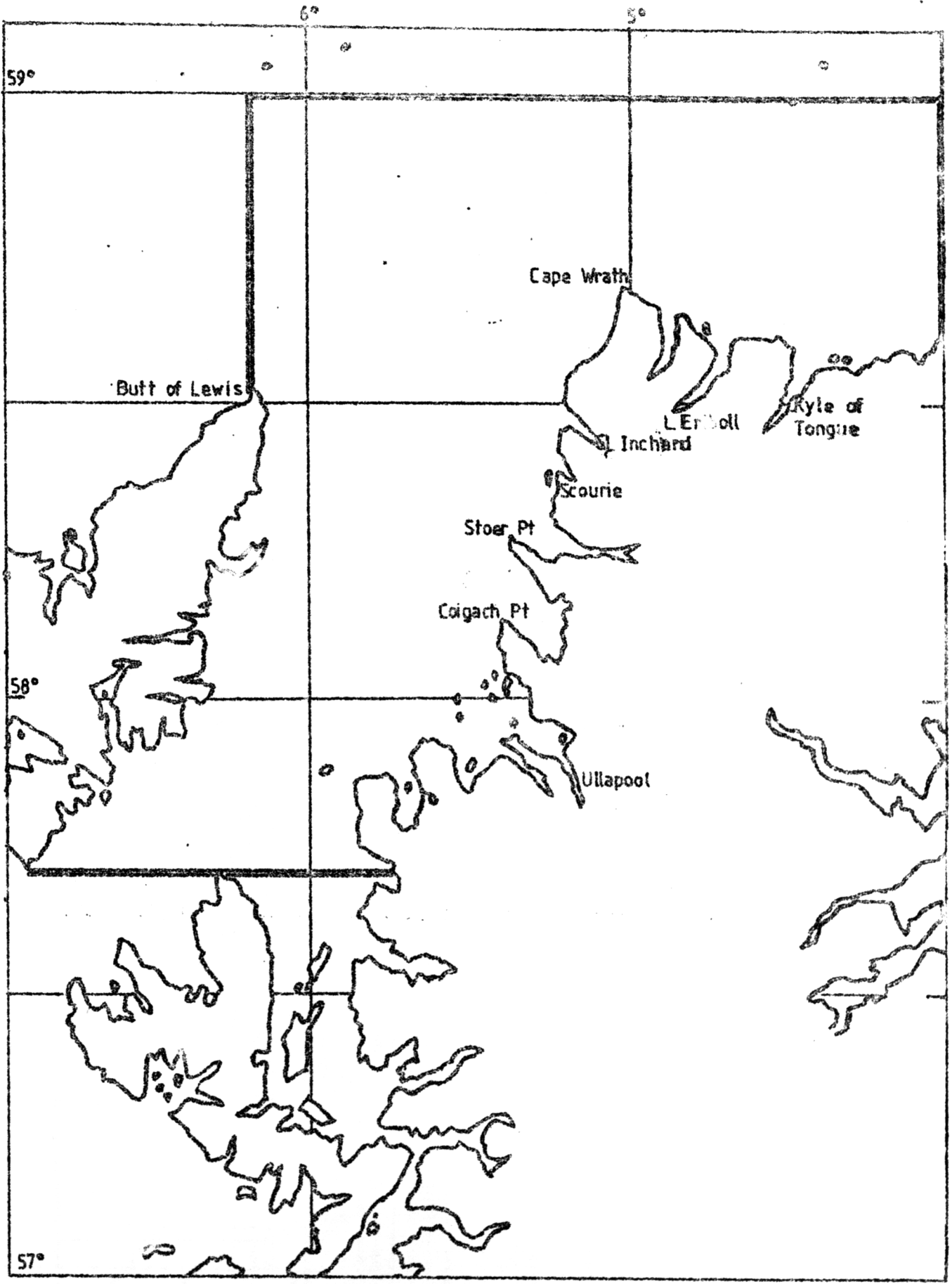
Echo integrator readings were obtained for all individual traces and will enable estimates of biomass to be made when a reliable acoustic target strength for mackerel has been derived. All echo integrator readings were entered, processed and stored in the computer.

Catches of mackerel were made at 25 out of 40 stations fished and routine biological sampling was carried out on these. The samples had a size range of 30-46cm with the main mode lying between 37-39cm. In this respect they were identical to the commercial landings taking place in the area at the same time.

One hundred mackerel were tagged using external flag tags.

M Walsh
11 November 1980

Seen in draft: G Geddes

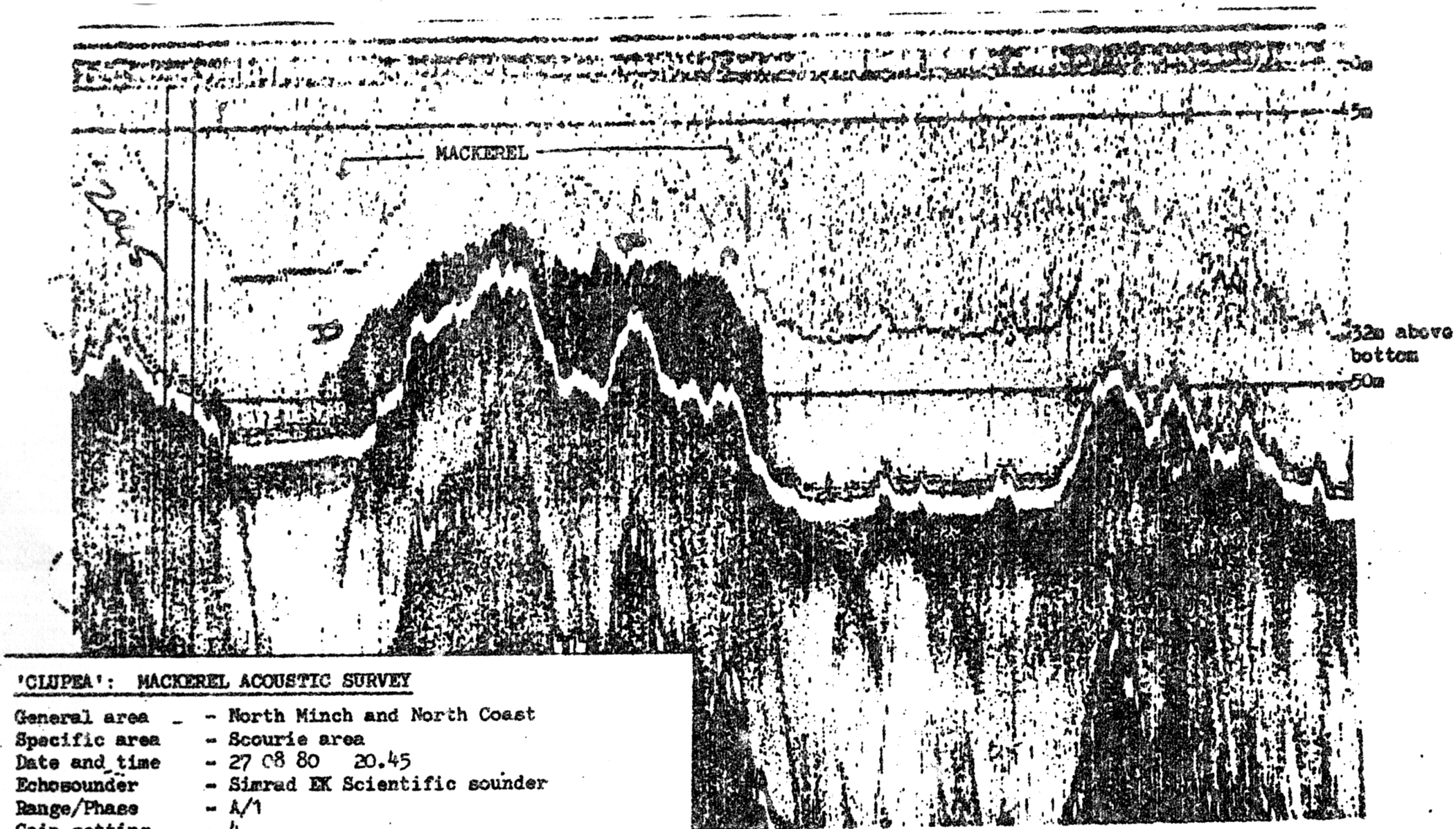


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FIGURE 1

A typical mackerel trace in the Minch.



'CLUPEA': MACKEREL ACOUSTIC SURVEY

General area - - North Minch and North Coast
Specific area - - Scourie area
Date and time - - 27 08 80 20.45
Echosounder - - Simrad EK Scientific sounder
Range/Phase - - A/1
Gain setting - - 4
Depth markers at - 5, 50, 32 from bottom, 3 and 2 from
bottom (metres)
Horizontal scale - (at 10 knots)

0.5 nautical mile

FIGURE 2