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R1/6

FRV 'CLUPEA' 14CR84 MB
Cruise 14/84

REPORT
9-29 November 1984

Objectives

1) To survey the distribution and abundance of young herring and sprats in the Clyde with an echo-sounder and mid-water trawl.

2) To investigate the biological composition of young herring and sprats in the Clyde.

3) To carry out an acoustic survey to estimate herring biomass in the Clyde.

4) To investigate diurnal variation in acoustic biomass estimates in an area of high herring abundance.

5) To investigate the availability and abundance of organisms in the Clyde which might be consumed by salmon smolts.

Narrative

Scientists and crew joined 'Clupea' in Buckie on the morning of 9 November. Sailing was delayed until the evening due to bad weather. Passage was then made as far as the west side of the Kintyre peninsula when gale force winds on the morning of 11 November, halted progress and 'Clupea' anchored off Crinan until the following morning. The Clyde was reached later that day and the first haul of the trawling survey was made off Pladda using an international young gadoid trawl (PT 154) fitted with a 12mm codend.

'Clupea' docked in Troon the same night when Mr McQueen of the Pitlochry laboratory joined the vessel. During the next 3 days a further 12 trawl stations were completed before berthing in Troon for the first half landing on 16 November. During the 16th Mr S Forbes joined 'Clupea' and the remainder of the acoustic equipment was installed and tested.

On the 17th 3 more trawl stations were completed before heading for Loch Ranza to calibrate the acoustic equipment and to change over from the PT 154 to a 'Clupea' high speed sampling trawl (PT 163) with a 20mm codend which was used for the remainder of the cruise. During the next 4 days a fairly extensive acoustic survey grid was carried out covering most of the Clyde north of 55° 23'N except the inner Clyde north of the Cumbraes. Mr McQueen left 'Clupea' at Troon during the week.

The acoustic survey was recommended on the 23rd after the second half landing and coverage of the remaining part of the Clyde was completed that day. During the remainder of the cruise an intensive survey grid was carried out in an area of high herring abundance south of Little Cumbrae island. During the first day the distributional area of herring echo traces was delimited while during the second day a fixed survey grid was repeated during the hours of daylight and darkness. A second acoustic calibration was carried out during the morning of the 25th when high winds prevented work in the survey area. Work was completed shortly before midnight on the 25th. Six trawls were made during the period of the acoustic survey to identify possible herring echo traces. Scientific personnel left 'Clupea' the following morning from Brodick and 'Clupea' then made passage for Aberdeen where the vessel docked in the morning of 30 November.

Results

In the routine trawling survey herring were taken at 15 out of 16 stations sampled with an average catch rate of 199 fish per one hour trawl. A provisional split of the data by age group is given in the table below with, for comparison, equivalent data from the previous 5 surveys:

Survey year	Stations sampled	Mean Nos herring per one hour haul			
		O-group	I-group	Older age groups	Total
1979	28	82	252	32	366
1980	25	126	50	47	223
1981	29	259	6	<1	256
1982	15	226	172	2	400
1983	16(15)	128(136)	675(51)	19(2)	822(188)
1984	16	96	95	8	199

The bracketed values given for 1983 are those derived if the largest haul, which provided a very high proportion of the total catch, is ignored.

The distribution of herring was similar to that observed on most previous surveys with O-group fish most abundant in the sea lochs and I-group most abundant in Inchmarnock and the outer Clyde. A preliminary investigation of VS data indicated the predominance of spring spawned fish amongst these 2 age groups, whilst amongst adults maturity data indicated a different mixture of spring and autumn spawners in each of 3 catches sampled with the proportion of spring spawners varying between 39% and 80%.

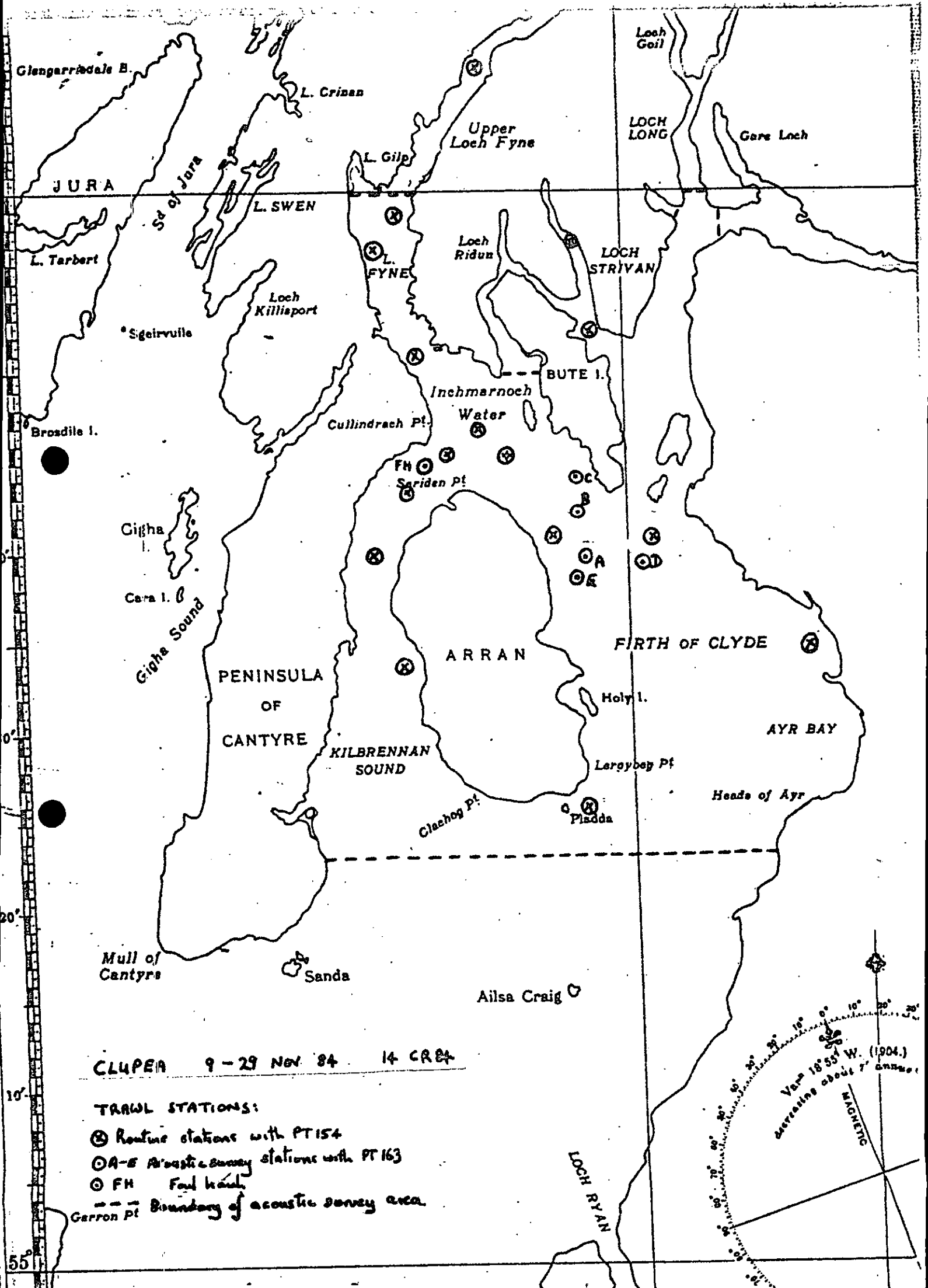
The other abundant fish species in the catches were sprats, small whiting, Norway pout and small saithe as in all previous surveys. The mean catch rate of sprats was the highest recorded during the 6 year period while those for whiting and Norway pout were around average. An unusual feature of the data this year was the large number of O-group mackerel taken at one station off Irvine Bay. The most abundant invertebrates caught were euphausids as in previous years.

In the acoustic survey very few typical herring-type echo traces were seen during the first 5 days although the whole of the Clyde was covered fairly intensively. Mid-water layer traces similar to those which had yielded mixed catches, including herring, in previous surveys were fished on 3 occasions but yielded insignificant proportions of herring. The intensive survey carried out in the last 2 days of the cruise in one of the few areas where likely herring echo traces had been observed, yielded a fairly high concentration of herring-type traces in a small area south of Little Cumbrae island. Trawling in this area confirmed the identity of fished echotraces to be herring. Detailed analysis of the results to estimate herring biomass has yet to be made. Positions of all trawls made during the cruise are given on the attached chart.

Further data to meet the fifth objective of the cruise were collected by Mr McQueen of Pitlochry to supplement those collected over the last 2 days. In addition a water sample for radio caesium analysis was collected off Buckie en route to the Clyde.

M Walsh

11 December 1984
Seen in draft
W Smith
Officer in Charge



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TRAWL STATIONS:

⊗ Routine stations with PT 154

⊙A–E Acoustic survey stations with PT 163

⊙ FH Fail haul

– – – Boundary of acoustic survey area