

R1/6

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FRV *Clupea*

5CR90

Cruise 5/90

REPORT

30 April - 9 May 1990

Personnel

P J Copland	HSO (in charge)
F Armstrong	SO
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Objectives

Study of herring spawning grounds in the Clyde estuary.

Narrative

Scientific staff joined the vessel in Ardrossan on 30 April and the side scan and navigation systems were installed and tested. An intensive survey of the Ballantrae egg patch and surrounding bank were conducted over the next three days using the 120 kHz side scan system. The tow fish was deployed alongside the boat and the survey was conducted at a speed of 3 knots. Data were recorded on the survey logging system for later computer analysis as well as being displayed on a paper display for visual indications of changes in bottom sediments. A Day grab was used to sample the bottom sediment in specific areas where changes in bottom type were seen. Areas around the south of Arran which local fishermen had described as possible spawning sites were surveyed over the next four days. A line of water samples were collected for oxygen analysis at the egg patch at Brown Head.

The Skelmorlie and Ardgowan banks were surveyed on 8 May before the Day grab and table were delivered to Kepple pier for use by the Millport Laboratory. *Clupea* then proceeded to Greenock, arriving at 1800. The vessel was unloaded on 9 April and staff returned to Aberdeen in the minibus.

Results

The survey of the Ballantrae Bank showed various ripple or ridge features extending far to the south of the site where herring eggs were known to have been laid. Suitable spawning areas for herring are those with a coarse sand, gravel or mearl sediment over which a good flow of water is present to provide oxygenation around the eggs. The flow of water builds these sediments up into ripples or ridges which can be identified by a horizontal (sidescan) acoustic beam. The slope of the ridge facing the vessel produces a large return while the trough produces little or no signal. This shows up as a series of regular light and dark horizontal lines on the paper display. With a little experience the operator could distinguish between different bottom types using the side scan system. Stony and muddy bottoms were easily recognised by the return signal strength while, in addition the spacing and intensity of the lines showed whether the ridges had developed in sand or another type of bottom.

Examples of sand, gravel and mearl ridges were found and their type verified by grabbing. In general, sand ridges were smaller in height and produced finer dark lines than those caused by larger sediments.

The areas of ridges were often as little as 50 metres wide but the excellent weather conditions encountered made accurate grabbing possible. The ridges, which normally ran parallel to the coastline, formed features extending out at right angles to the coastline. The wave length of the features may be deduced from the recorder paper. If a mixture of bottom sediments existed such as stones on sand or mud these were identified by the "speckling" effect overlying a constant background return. In general sand based features reflected more energy than mud based ones.

The survey of other areas around south Arran was conducted at 5 knots to achieve as much coverage as possible with the intention being to concentrate the search in areas of interest using a finer grid spacing and slower speed to define the edges of the feature. Unfortunately, apart from some small patches of mearl and gravel close to the known area of eggs laid at Brown Head there was no evidence of suitable sediment in the areas surveyed. The Ardgowan and Skelmorlie banks also proved to have no ridged areas.

A bottom following algorithm for the ship's echosounder/Archimedes system was installed but the system still had a tendency to lock to a second bottom echo or to the next transmit pulse. The need for further work on the system was indicated.

P J Copland
12 September 1990

Seen in draft: W Smith