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FRV *Clupea*

Cruise 0401C

**REPORT**

5-16 March 2001

**Personnel**

| | |
|---|---|
| S P R Greenstreet | (In charge) |
| J Dunn | (5 to 9 March and 15 to 16 March) |
| M Robertson | |
| S Hughes | (5 to 9 March and 15 to 16 March) |
| I M Gibb | (9 to 16 March) |
| H M Emmerson | |
| B Scott | University Staff (5 to 6 March) |

**Cruise Objectives**

To lay long-term hydrographic monitoring moorings off Stonehaven, on the Wee Bankie, and off the Marr Bank.

To conduct a hydrographic and plankton survey along a transect off Stonehaven.

To determine spatial variation in the water temperature and salinity profile within the main Wee Bankie/Marr Bank study area by CTD dips.

To carry out a night-time grab survey to assess sandeel abundance and distribution in sediments previously determined as suitable sandeel habitat. The sediment samples collected during this survey will be used to assess the RoxAnn derived sandeel habitat map.

To obtain samples of sandeels for population age structure analysis at pre-determined stations on the Wee Bankie, Marr Bank and Berwick's Bank using a sandeel dredge.

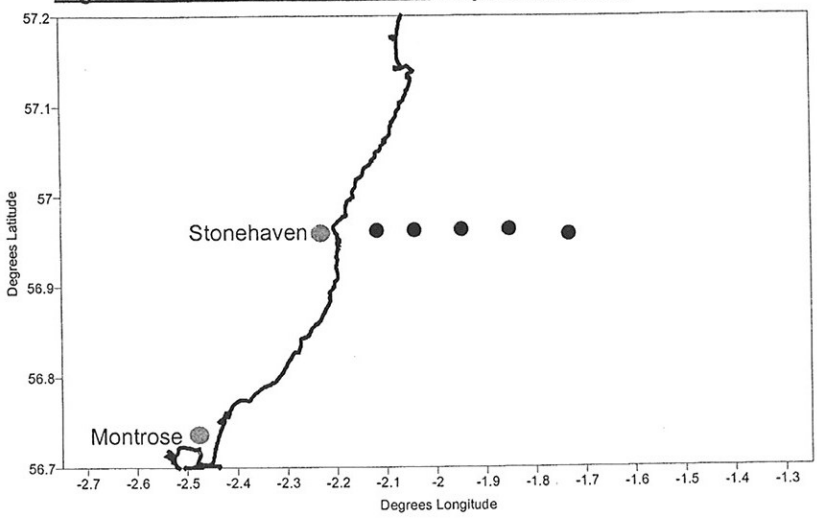
**Out-turn days per project:** 4 days MF0463; 8 days C683

**Narrative**

Most of the scientific equipment was loaded on board at Fraserburgh on 28 February. Computing and water sampling equipment was set up in the laboratory on 1 March.

Scientists joined the vessel at Fraserburgh at 0800 hours on 5 March and the vessels sailed at 1000 hours. *Clupea* arrived at the eastern most end of the Stonehaven transect at 1645 hours. The 1 m plankton net was then deployed at five stations along the transect (Fig. 1), finishing by 1900 hours. The vessel then sailed for Montrose. This completed the sampling using this particular gear and so allowed the mooring wire arrangements to be set up on the trawl winch servicing the A frame. When deploying the 1 m plankton net it became apparent that the echo sounder in the laboratory, and the repeater on the aft deck, were inoperative. Repairs were organised and carried out in Montrose during the evening.

**Figure 1. Stonehaven transect: 1m plankton net.**




On 6 March the Wee Bankie mooring wires were set up on the trawl winch and at 1000 hours *Clupea* sailed in an attempt to lay the mooring. However it quickly became obvious that the sea conditions were too bad to allow this operation to be carried out safely. *Clupea* than headed north to try and complete the hydrographic sampling along the Stonehaven transect, but worsening weather, and a poor forecast, soon eliminated this as an option as well. *Clupea* then returned to Montrose.

On 7 March the wind had dropped and by 1100 hours the sea state was declining to the point where work was possible. *Clupea* sailed at 1130 hours and made for the Wee Bankie where the first hydrographic mooring was successfully laid by 1545 hours. A CTD dip was made and a water sample collected at 25 m depth in order to collect some calibration data for the instruments on the mooring. During this process it was discovered that the pay-out metering system on the hydrographic winch was inoperative and once again it was necessary to arrange for repairs to be carried out at Montrose during the evening. By the time the Wee Bankie mooring was laid there was insufficient time to steam out and lay the Marr Bank mooring prior to the onset of darkness. With no metering system on the hydro winch it was deemed too risky to deploy the CTD, and so, unable to do any other work, *Clupea* returned early to Montrose to allow repairs to be carried out.

On 8 March the remaining mooring equipment and sandeel dredges were loaded on the vessel at Montrose, except for the spar buoy, which for reasons of space was returned to Aberdeen. *Clupea* then sailed at 1000 hours to deploy the Marr Bank hydrographic mooring. This was successfully deployed at around 1530 hours and a further CTD dip was made close to the mooring location to obtain calibration data. This work was completed 1630 hours and *Clupea* started the return journey to Montrose. On route six CTD deployments were made as part of the grid of stations within the main study area. *Clupea* arrived back in Montrose at 2230 hours.

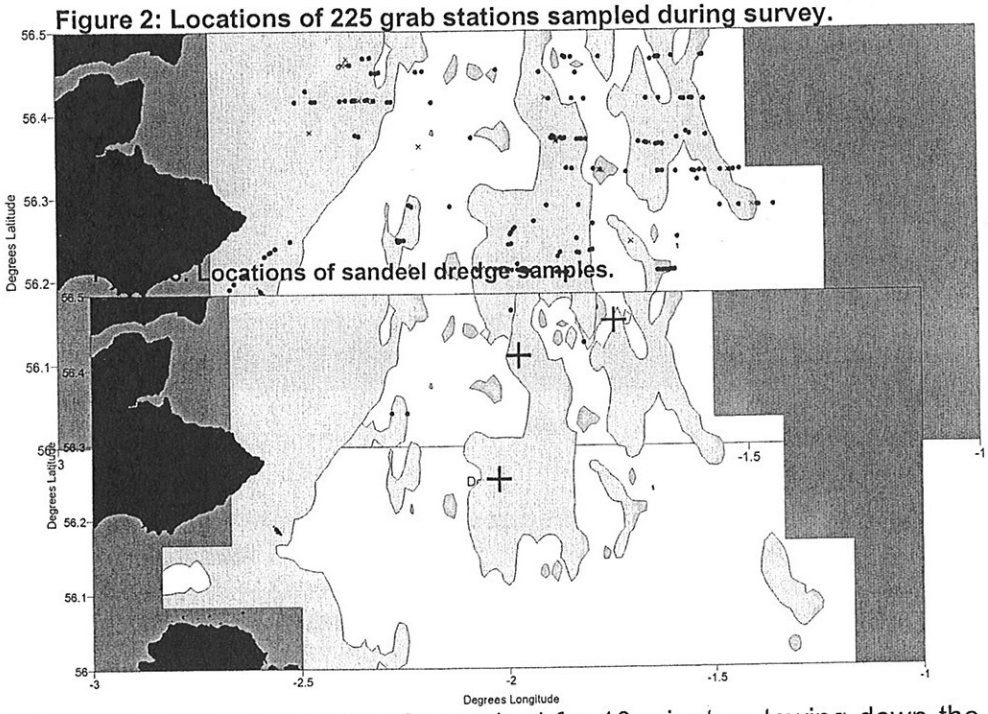
On 9 March John Dunn and Sarah Hughes left, and Iain Gibb joined the vessel.

*Clupea* left Montrose at 1700 hours to commence nocturnal grab sampling, dredge sampling and hydrographic CTD survey work in the main study area. Over the following six nights 225 grab stations were sampled (Fig. 2). At 34 stations no sediment sample was obtained. At a further six stations, sufficient material was obtained to allow a sediment sample to be taken (using a 32 mm internal diameter corer), but the penetration depth of the grab was such that capture of any sandeels, should they have been present in the sediment, was deemed unlikely. In total, 185 valid sandeel assessment grab samples were obtained, of which 52 contained sandeels,

providing a total catch of 406 sandeels. All sandeels caught were measured (to the half centimetre below) and weighed (to the nearest 0.1 g). Otoliths were removed from all fish to enable age determination back in the laboratory.

At three locations the modified sandeel dredge was deployed to collect sufficient sandeels for more accurate estimation of population age and length composition (Fig. 3). At each location

**Figure 2: Locations of 225 grab stations sampled during survey.**

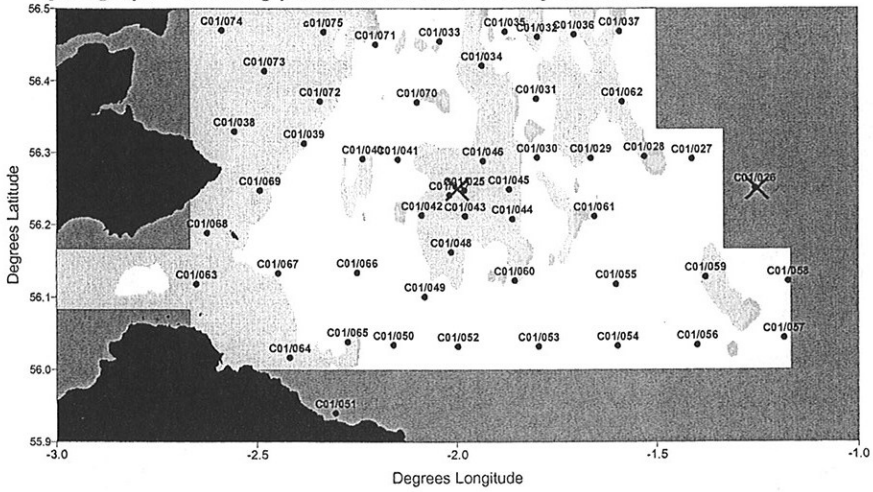



the dredge was towed twice along the seabed for 10 minutes, towing down the line in both directions. A Scanmar depth unit was attached to the dredge so that the precise time of touch-down on to, and lift-off from, the seabed could be determined. The total number of sandeels in each of the six catches was counted and a sub-sample from each was measured to the half-centimetre below. Five sandeels from each half-centimetre size class were weighed to determine length-weight relationships. Otoliths were removed from these fish to establish age-length keys.

The CTD and flurometer were deployed so as to obtain as even coverage across the study area as possible. Generally, the CTD was deployed at convenient grab stations, but in some areas, particularly in the southern part of the study area where few grab stations were located, it was necessary to steam to particular locations specifically to collect CTD data (Fig. 3). Figure 3 also shows where the two hydrographic moorings were laid in the main study area and includes the

CTD dips made when these moorings were being deployed (see above). One CTD dip was made whilst at anchor off Pease Bay to the south of the main study area.

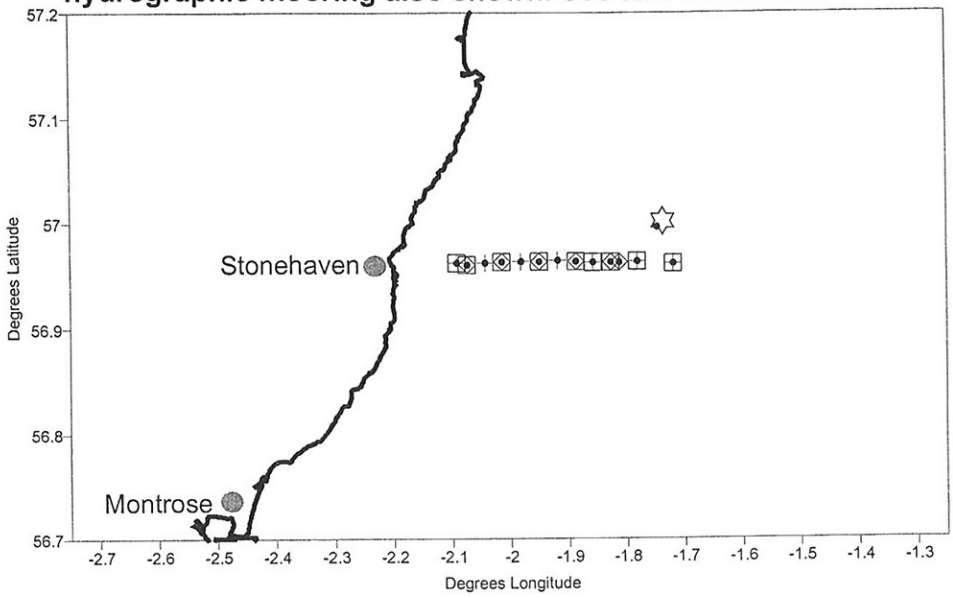
**Figure 4: Locations of CTD/flurometry stations (circles) in the main study area. Hydrographic mooring positions are indicated by crosses.**




During the course of the nocturnal grab, dredge and CTD survey work, *Clupea* spent the daylight hours at anchor: off St Andrews on 10 March, Pease Bay on 11 March, St Abbs on 12 March, Anstruther on 13 March and Carnoustie on 14 March. This work was completed by 2200 hours on 14 March whereupon *Clupea* sailed for Montrose, arriving at 2400 hours. At 0900 hours on 15 March most of the heavy scientific equipment was unloaded and the third spar buoy was loaded once again. John Dunn and Sarah Hughes rejoined the vessel.

At 1130 hours *Clupea* sailed to lay the third hydrographic mooring off Stonehaven and to complete hydrographic sampling along the Stonehaven transect (Fig. 5). *Clupea* arrived on station at 1400 hours and laying of the hydrographic mooring (star) was completed by 1500 hours. A CTD dip was made close to the mooring to collect calibration data. *Clupea* then steamed west along the Stonehaven hydrographic transect, making CTD dips and collecting 10 m surface water column hose samples for phytoplankton analysis, at each of the 13 stations sampled (dots). At nine stations a dual Bongo net was deployed to collect zooplankton samples (squares). At six stations a water sample was collected using Van Doorn bottles at 10 m depth to collect salinity and chlorophyll CTD calibration samples (diamonds). At seven stations water samples were collected using Van Doorn bottles at the water surface and close to the seabed for silicate, nutrients, salinity, and chlorophyll analysis (crosses).

**Figure 5. Stonehaven transect: CTD, phytoplankton, nutrients, silicates and chlorophyl sampling. Position of Stonehaven hydrographic mooring also shown. See text for details.**




Work on the Stonehaven transect was completed by 1745 hours, whereupon *Clupea* sailed for Fraserburgh, arriving at 2300 hours. The remainder of the scientific equipment was off-loaded and scientists left the vessel by 1045 hours on 16 March.

S P R Greenstreet
26 April 2001

Seen in draft: A Simpson, OIC