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CHARTERED VESSEL RV *CHALLENGER*

REPORT

Cruise 2293H Part II

21 June - 5 July 1993

Personnel

P J Wright HSO (SIC 21-30 June; 21 June - 1 July only)
M C Bailey Research Assistant (Aberdeen University; SIC 1-5 July)
W Leiper Craftsman
N Collie PTO (21 June - 1 July)
A MacIntosh SSO (21 June - 1 July)
P Barkel PTO (21 June - 1 July)
F Armstrong SO (1-5 July)
I Gibb SO (1-5 July)

Objectives

1. To investigate the horizontal distribution of sandeel shoals around Shetland and Fair Isle, including a detailed investigation of the region around Sumburgh. Sandeel distribution between Shetland and Lewis will also be investigated if time is available.
2. To investigate the relationship between seabird foraging patterns and the distribution of their prey.
3. To carry out a hydrographic and late larval survey between Shetland and Lewis.

Out-turn days per project - Sandeels at Shetland project 15 days.

Narrative

Challenger sailed from Lerwick at 1600 on 1 June 1993, proceeding immediately to the first sandeel trawl station near Voe, south Shetland. The first half of the cruise comprised a combination of beam trawling, dredging, grab sampling, Methot sampling and video deployments at key sandeel grounds close to the seabird colonies. Sampling was carried out between video deployments, since it was only possible to deploy the camera during slack tide. The drift frame video system proved to be very effective for investigating fine-scale distribution and seven deployments near Sumburgh, South Sands and Fair Isle were completed. Samples for toxicological and growth studies were obtained from 41 trawl and dredge deployments. Grabbing also proved to be an effective means of sampling sandeels from small (<0.5 km) patches of sand. A thermosalinograph was run throughout the cruise using the non-toxic pumped sea water supply from 3 m. A Chelsea CTD and fluorometer logging system was deployed at all trawl stations and further offshore, completing a grid of stations begun by the preceding "*Braer*" *Challenger* survey. *Challenger* returned to Lerwick on 30 June for the change in scientific staff and the

collection of echointegration equipment. Echointegration equipment was installed on the morning of 1 July and the vessel left Lerwick at 1700 to begin the acoustic survey. The survey involved a zig-zag track covering the area from the south coast of Shetland to Loch Erribol. Unfortunately, the acoustic survey was subsequently interrupted due to a fault in the vessels generator. The vessel ceased scientific operations at 2015 on 4 July and proceeded directly to Ullapool. *Challenger* docked at Ullapool on 5 July.

Results

Sandeels densities were concentrated within 10 km of the coast around Shetland and were similar to 1992. High densities of sandeels were also found close to Orkney. 0-group fish were patchily distributed and collaborative studies suggested that these regional differences in abundance were reflected in the breeding success of surface feeding seabirds. Levels of PAH and detoxifying enzymes in the liver of 1+ sandeels reflected waterborne hydrocarbon concentrations, being higher on the south west than the south east coasts of Shetland. Evidence of hydrocarbon exposure was also found in sandeels from as far away as Fair Isle and Foula. Details of the cruise results are given in the final ESGOSS report, June 1994.

P Wright
12 April 1994

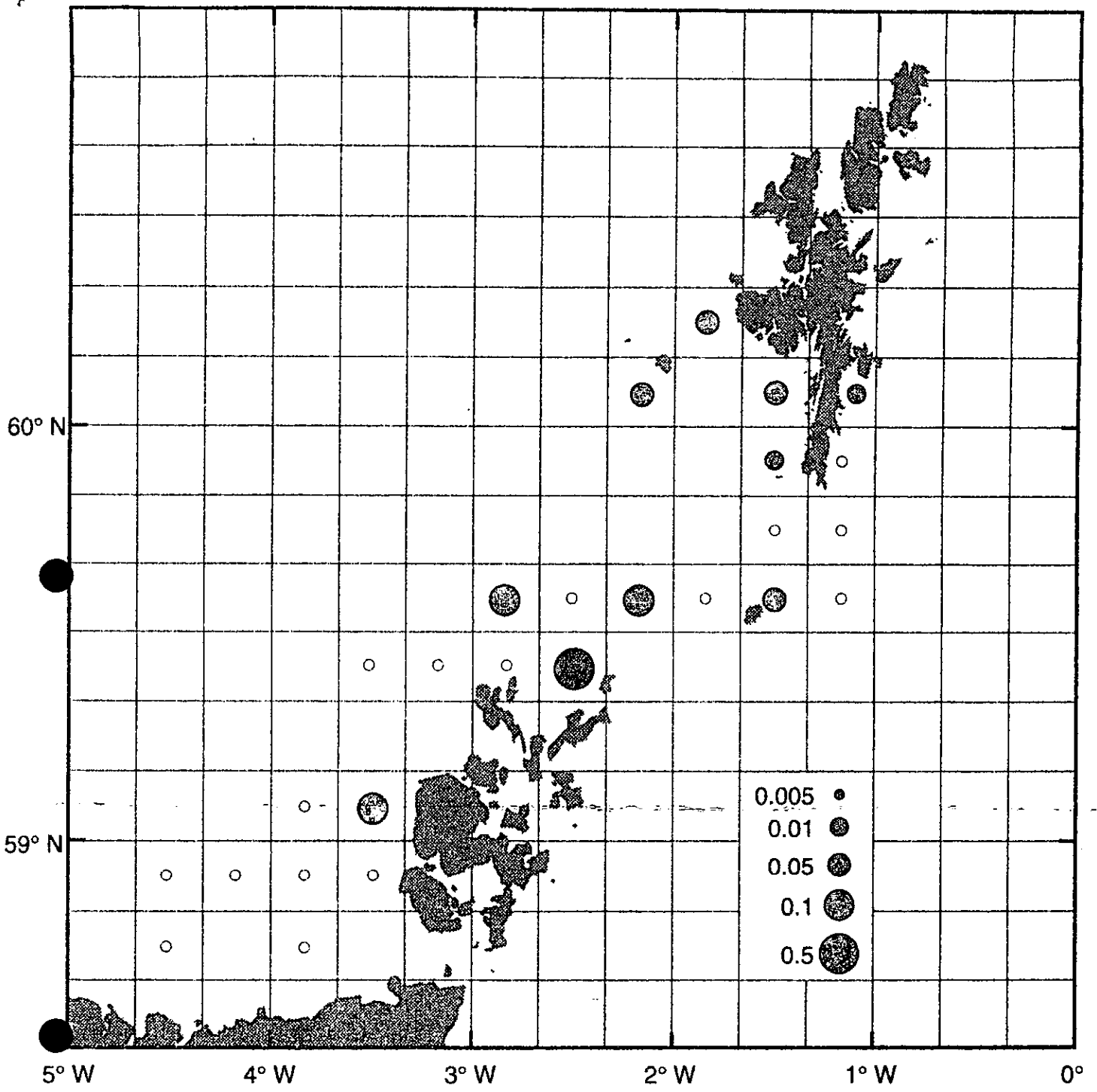


Chart showing sandeel distribution, based on acoustic surveys. Density based on relative echointegral values.

Chart showing levels of oil in sediments (ppm) two weeks after the Braer grounding and mean (\pm SE) levels of reorufin (EROD) activity in liver tissue of *A. marinus* for given sites in June (histograms).

