

R1/12

Not to be cited without prior reference to the Marine Laboratory, Aberdeen

FRV *Scotia*

Cruise 1397S Part II

REPORT

22 October - 6 November 1997

Loading: Aberdeen
Unloading: Aberdeen

Fishing Gear: PT153 (Large Pallets + 3 m² doors), 3 metre beam trawl, Aggasiz trawl

Personnel

W R Turrell	PSO
G Slessor	HSO
P Gillibrand	HSO
R D Adams	SO
F Brown	SO
L Bullough	PhD Student
M Mowat	University of North Wales
M Lewis	University of Aberdeen
S Bowe	University of Aberdeen

Out-turn days to projects: 15 days BKC1

Objectives

1. To perform hydrographic surveys along the standard Faroe-Shetland Channel sections using a CTD with rosette water sampler. A thermosalinograph will also be run continuously.
2. To perform detailed experiments concerning the sampling, storage and analysis of nutrient samples.
3. To deploy a NORDIC WOCE ADCP mooring (NWSE) at the shelf edge west of Shetland.
4. To recover, service and redeploy a NORDIC WOCE ADCP mooring (NWSD) in the centre of the Faroe Shetland Channel.
5. To perform experimental deep water trawls northwest of Shetland along the Munken - Fair Isle line.
6. To recover and store samples of the deep water coral *Lophelia pertusa*.
7. To deploy and recover temporary fish trap moorings for a duration of approximately 24 hours at various sites along the Munken - Fair Isle line.
8. To perform repeat ADCP sections in conjunction with satellite altimeter over-flights (If external funding for hire of DGPS approved)

9. To perform experimental trawls in order to assess surface fish population in the autumn at a location known to have high concentrations of salmon post-smolts during the summer.
10. To perform hydrographic surveys along the JONSIS standard section if time permits.
11. To collect the Fair Isle caesium sample, and samples of sea water for laboratory use.

Narrative

After completing the supplementary part of 1397S, samples collected around the Captain field were unloaded in Aberdeen, and *Scotia* sailed at 1000 hours on Wednesday 22 October (all times are GMT). The Fair Isle caesium sample was collected at 0036 hours the following day, during the passage to the start of the Fair Isle Munken line, where the CTD survey commenced at 0732 hours.

Work along this line proceeded until the Foinaven area, where an extended Development Area prevented *Scotia* occupying three of the normal standard stations. These had to be relocated to similar water depths at the edge of the exclusion box. Once these were completed, poor weather prevented the ADCP mooring, which was in the area, from being recovered so *Scotia* continued with the hydrographic survey until 0300 hours on Friday 24 October, by which time 10 of the standard stations had been completed. *Scotia* then returned to the location of the mooring to await day break. An acoustic sweep of the area to locate the mooring commenced at 0430 hours on Friday 24 October.

By 0830 hours the mooring had been successfully released and recovered on board. *Scotia* then returned to the location of the first fish trap mooring and this was successfully deployed by 1030 hours. *Scotia* then resumed the hydrographic survey along the standard section, deploying a second fish trap at 1530 hours and completing the line by 2050 hours on 24 October. *Scotia* then proceeded to Thorshavn, where she entered at 0800 hours on Saturday 25 October.

After unloading the Nordic WOCE 75 kHz ADCP at Thorshavn, *Scotia* sailed at 1110 hours. There then followed an intensive beam trawl survey back across the Channel along the Fair Isle Munken line, complimented by repeated deployments of the two instrumented moored fish trap rigs. Between 1600 hours on Saturday 25th and 1250 hours on Tuesday 28 October six fish trap deployment/recoveries had been performed along with 17 hauls using the beam trawl. During the first trawls, a cod-end was lost from the beam trawl due to the excessive weight of rocks and mud caught in the net. A second cod-end was successfully fitted by the crew, who at the same time installed a rock catching portion in the net. This device was extremely successful, and allowed the remainder of the trawls to be performed without any further significant damage occurring.

After the conclusion of this survey *Scotia* went on to deploy two ADCP moorings in the vicinity of the Foinaven development area. This work was completed by 1800 hours and *Scotia* then proceeded to the Wyville Thomson Ridge. On arrival in the area a preliminary CTD cast was performed in order to locate the depth of the deep pycnocline north of the ridge. By 0310 hours on Wednesday 29th a first fish trap had been deployed at this location, and by 0500 hours a second trap had been deployed at the same depth to the south of the Ridge. *Scotia* then proceeded to an area where previously salmon post-smolts had been successfully caught. On arrival in the area at approximately 0800 hours severe initial problems with the gear were encountered, primarily caused by short sweeps being fitted. The crew managed to re-rig the gear, and after this two successful hauls were performed, one in full day light and one in darkness.

After completion *Scotia* proceeded to steam along a section passing through the locations of the fish traps, and crossing the WTR. This section was surveyed using the CTD and work

commenced at 2300 hours on Wednesday 29th and was completed by 1030 hours the following day. *Scotia* then immediately proceeded to the trap locations, and both were recovered by 1530 hours.

Scotia then returned to the Fair Isle Munken line, where three further beam trawl hauls were performed in order to sample areas occupied by water of types previously un-sampled. On completion at 0630 hours Friday 31 October passage was made to the northern end of the Nolso Flugga section, where the standard CTD survey commenced at 1914 hours that day and was completed by 0030 hours on Sunday 2 October.

There then followed a second period of intensive beam trawl hauls back along the Nolso Flugga standard section. A further 10 trawls, accompanied by grab samples, were performed at 100m depth intervals depths from 1,000 m to 200 m. After advice was obtained on the likely weather in the area the work was finished at 0200 hours on Monday 3 November and *Scotia* steamed towards the JONSIS line. Survey work along the line commenced at 0100 hours on Wednesday 5 November, but had to be abandoned at 0630 hours in order for *Scotia* to make passage to Aberdeen, where she arrived at 2100 hours that evening.

Results

The cruise was characterised by excellent weather, allowing almost 15 days of very intensive work. In terms of the cruise objectives, the following results were obtained:

1. The two standard sections were successfully surveyed. Preliminary results indicate a sharp frontal feature existed at the offshore edge of the slope current on the Fair Isle Munken line, with an enlarged core of saline water above the slope. TS diagrams reveal that the freshening of intermediate waters observed in March has persisted, although not too such as great an extent. Arctic Intermediate Water remains as a salinity minimum, rather than the deeper Norwegian Sea Arctic Intermediate Water, which normally exhibits the lowest salinities.
2. The multiple nutrient test was performed successfully at the centre of the Fair Isle Munken line. Time zero nutrients were analysed on board. The remainder were stored in the appropriate manner and will be analysed in due course in order to determine any problems arising during this stage.
3. The NORDIC WOCE ADCP mooring (NWSE) was deployed at the shelf edge west of Shetland.
4. The NORDIC WOCE ADCP mooring (NWSD) was recovered and taken to Faroe for servicing. A replacement was redeployed.
5. Thirty 10-20 minute tows with a 3 m beam trawl were undertaken. This work was extremely successful, partly helped by the excellent weather experienced during the trip, but also by the diligent exertions of the officers and crew. The work was very intensive, but very rewarding. Twenty hauls were made from the Faroese shelf to the Scottish shelf (along the FIM transect). Ten hauls were made on the Scottish continental slope and shelf along the Nolso-Flugga transect. Twenty five fish species from 12 families were recorded. *Raja hyperborea*, *Onogadus argentatus*, *Cottunculus microps*, *Lycodes eudipleurostictus* and *L. esmarki* were the only species caught in the cold bottom water. Megafauna was recorded and samples preserved for identification.

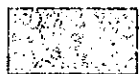
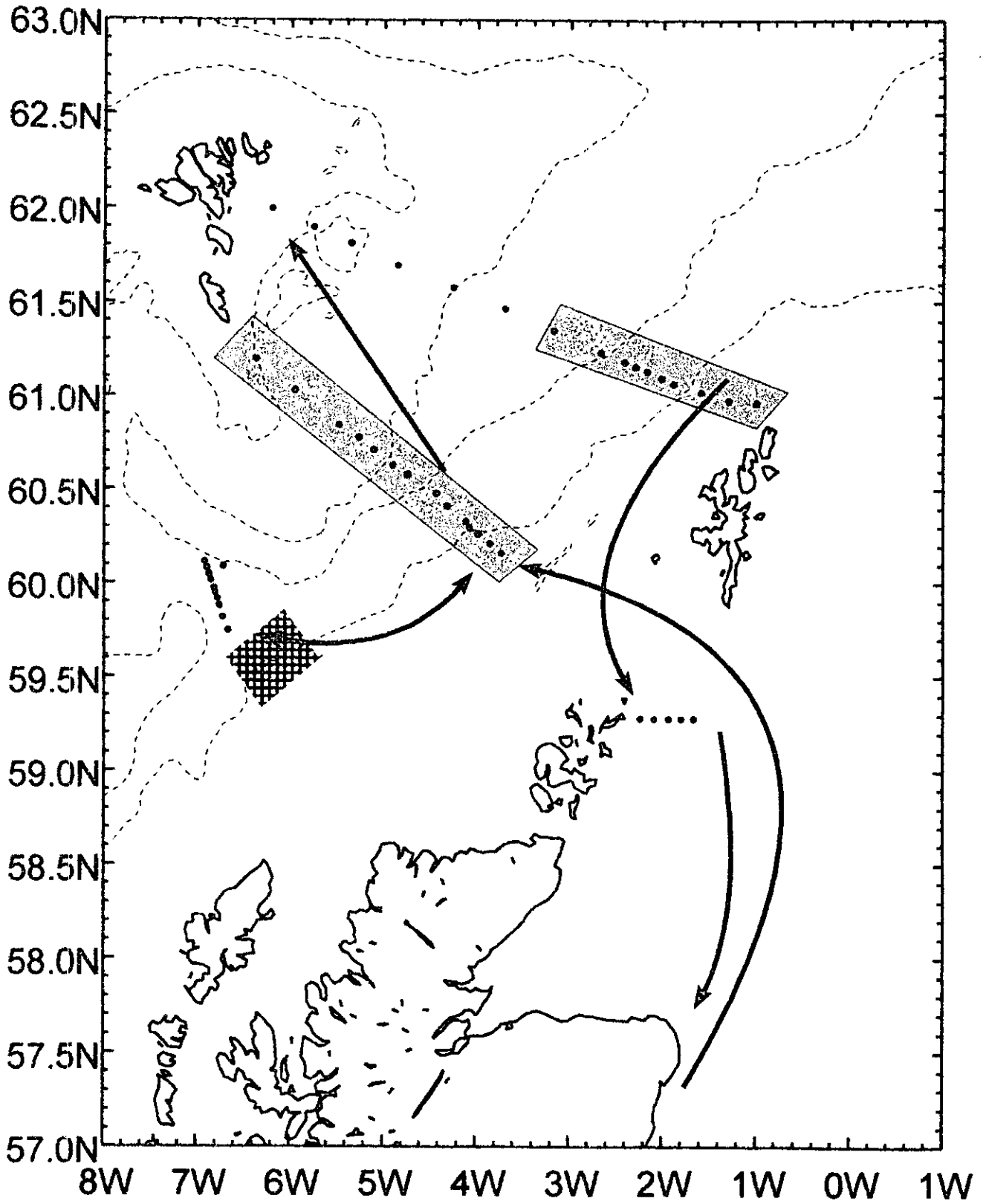
Sediment from approximately the centre of each successful tow was sampled using a day grab. Eighteen successful grabs were achieved. On the shelf and upper slope sandy sediment dominated. Clay-mud with large boulders was found on the lower slope and bottom of the channel.

6. Dead fragments of the cold water coral *Lophelia pertusa* were found in two trawl catches (Stations 487 and 488) and in one grab sample (Station G502).
7. Acoustically released fish traps were deployed at four stations on the Fair Isle - Munken transect, twice on the Wyville Thompson Ridge and twice on the Nolso-Flugga transect. *Onogadus argentatus*, *Brosme brosme* and *Myxine glutinosa* were captured. Amphipod traps, minilog temperature loggers, a Seacat CTD and Aanderaa current meter were attached to the trap moorings.
8. External funding was not forthcoming for this work, and it was not performed.
9. Two hauls at the southern end of the Wyville-Thomson Ridge were performed, checking whether there is an autumn occupation of the area by salmon post-smolts. The results indicate that at this time of year the area is very different from late spring - summer. One haul was conducted during day light hours (when previously predominantly smolts were caught in the area) and one in darkness (when previously large catches of herring and mackerel were obtained). The results of the two hauls were as follows; Daytime haul (four hours): Total catch was two lumpsuckers, two garfish and a gannet. Nighttime haul (three hours): Total catch was one herring, four juvenile horse mackerel, four squid, 500 euphausiids, four myctophids, 15 ctenophores, 10 medusae and a salp.
10. Limited time was available, permitting only five stations along the JONSIS line to be performed before *Scotia* left the area.
11. The Fair Isle caesium sample was collected.

W R Turrell
19 November 1997

Seen In Draft: J Nichols

Cruise 1397S



Beam trawls, grabs and fish traps



Pelagic post-smolt hauls