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FRV *Scotia*

Cruise 0705S, Part I

REPORT

7–27 May 2005

Loading: Aberdeen
Unloading: Aberdeen

Personnel

G Slesser	In Charge	
J Beaton		
N Collie	7-18 May	
M Rose	7-18 May	
T Amundrud	7-18 May	
A Gallego	7-18 May	
J P Lacaze	7-18 May	
J MacLean	19-27 May	
G MacDonald	19-27 May	
R Shelton		Atlantic Salmon Trust
J Holst	19-27 May	Institute for Marine Research, Bergen
T Gridley		University of Aberdeen
C Embling		University of St Andrews

Gear

SeaBird CTDs, ADCPs, SonoBuoys, Acoustic releases

Objectives

1. To perform hydrographic surveys along the JONSIS standard section in the northern North Sea.

2. To perform hydrographic surveys along the standard Faroe Shetland Channel sections.

3. To service two ADCP moorings in the Faroe Shetland Channel.

4. To recover two current meter moorings and re-deploy these moorings east of the Shetland Islands.

5. To recover a current meter mooring west of the Shetland Islands.

6. To carry out coastal hydrographic surveys.

7. To investigate post-smolt migration pathways along the shelf edge.

8. To perform ad-hoc CTD surveys in order to describe the environment within which post-smolts are found.

9. To undertake a pilot study for the use of synthetic adsorbents in order to assess the concentration of free marine biotoxins and other compounds in the environment.

10. To collect 20 carboys of low nutrient seawater for QUASIMEME.

11. To perform ad-hoc towed array acoustic recordings for cetaceans and deployment of sonobuoys.

Out-Turn Days per Project: 16 days: AE11r0, 5 days: AE1190

Narrative

Scotia sailed from Aberdeen at 1200 (all times are GMT) on Saturday 7 May for the start of the JONSIS standard section. CTD measurements and water sampling commenced at 0252 on Sunday 8 May. A short break was made prior to JONSIS station "1a" to make a temporary replacement of a leaking hydraulic fluid pipe on the CTD crane. The line was completed at 1521 on Sunday 8 May. (Stns 140-151).

Passage was made to the start of the East of Shetland Line 2 and CTD sampling commenced at 0008 on Monday 9 May. This sampling continued till 1009 when the *Scotia* broke off sampling operations to make passage for Lerwick to procure a hydraulic pipe to replace the temporary hydraulic pipe on the CTD crane. Passage was then made to complete the remaining part of the East of Shetland Line 2. This line was completed at 1806 on Monday 9 May. (Stns 152-162). *Scotia* then made way to the start of the East of Shetland Line 3. This line was worked until 0431 on Tuesday 10 May (Stns 163-167). At this time *Scotia* made passage to the East of Shetland 2 mooring (60°28.54'N 000°07.71'W) position.

On transmission of the release command to the acoustic release at the East of Shetland 2 mooring position, the acoustic release would not come free from the mooring anchor. After attempting to free the mooring using a bottom creeper the mooring was brought to the surface on the second attempt using the recovery trawl. After the necessary maintenance the mooring was re-deployed (60°28.63'N 000°07.75'W) at 1525 on Tuesday 10 May. Passage was then made to the East of Shetland 1 mooring (60°34.44'N 000°37.90'W) where a successful recovery of this mooring was made. This mooring was re-deployed (60°34.50'N 000°38.08'W) at 1916 on the same day. This was followed by overnight passage to the West of Shetland mooring position (60°45.83'N 001°27.12'W). At the beginning of this year a current meter from this mooring was returned to FRS by personnel of a seismic vessel. This vessel had towed over the mooring position. After several attempts of trying to interrogate the acoustic release of this mooring the conclusion was drawn that it was no longer on position. A grid was drawn up in an attempt to locate the remaining part of the mooring. After several hours of trying to locate the mooring it was decided to give up and *Scotia* made passage to the start of the Nolso-Flugga line for CTD measurements and water sampling. Work commenced at 1733 on Wednesday 11 May.

This section was completed at 2049 on Thursday 12 May (Stns 168-183). Ships passage was then made to the start of the Fair Isle - Munken section where CTD stations commenced at 0118 on Friday 13 May. The section was completed at 2116 on Friday 13 May (Stns 184-197) and passage was made to the NWOCE mooring position NWSE (60°16.61'N 004°20.02'W).

ADCP mooring NWSE (60°16.61'N 004°20.02'W) was recovered at 0540 on Saturday14 May followed by the recovery of ADCP mooring NWSD (60°27.02'N 004°22.54'W) at 0810. Following maintenance work on mooring NWSD, the NWSD mooring (60°26.99'N 04°22.48'W) was successfully deployed at 1315. This was followed by the deployment of the NWOCE mooring NWSE (60°16.58'N 04°19.89'W) at 1743.

Scotia then proceeded to east of Sumburgh Head to start CTD section work at east and north of the Shetland Islands and this continued until the half landing at Lerwick on Wednesday 18 May. During this time five CTD sections were surveyed (Stns 198-243).

In Lerwick a change in scientific personnel took place. On Wednesday evening presentations were given by Dr Turrell and Dr Holst to North Atlantic Fisheries College staff and students followed by a guided tour of the *Scotia*.

Scotia departed from Lerwick at 1300 on Thursday 19 May for west of Shetland where initial deployment trials of the salmon trawl took place. Thereafter passage was made to the Minch where calm waters provided the ideal location for preliminary trials of the gear. The gear comprised a 60 m (wide) x 10 m (deep) open ended trawl net, modified by attaching a metal frame holding a CCTV camera inside the net. A cable link from the camera fed to a transmitting aerial aboard a small catamaran which was towed further behind the net. Transmissions from the catamaran were received from a ship mounted aerial thus providing live CCTV footage of fish passage through the trawl net. Over the next three days trials continued until the rigging/deployment of the net and transmission of signals was deemed to have been successfully achieved. On the evening of Sunday 22 May passage was made to the shelf edge west of the Butt of Lewis, a known feature associated with post-smolts, where 4 transects were conducted over the following three days.

On completion of these transects *Scotia* returned to Aberdeen, where she berthed at 1900 on Thursday 26 May.

Results

The weather conditions throughout the trip were reasonably good throughout the cruise and no ship time was lost.

1. The JONSIS standard section in the northern North Sea was surveyed.

2. The two standard Faroe Shetland Channel sections were surveyed.

3. The two Nordic WOCE ADCP moorings NWSD and NWSE were recovered successfully and data downloaded. The 75 KHz Broadband ADCP recovered at NWSD was replaced by a Workhorse ADCP and the NWSE Workhorse ADCP re-deployed. The recovered ADCP data will be processed in the laboratory by in-house software.

4. The current meter moorings for this objective were successfully recovered, the current meters replaced and the moorings re-deployed.

5. The remaining part of the mooring west of the Shetland Islands was not recovered. A further attempt to recover the mooring maybe made during early October. This mooring was towed over during late December 2004 and the top current meter returned to FRS during January 2005.

6. North and east Shetland CTD sections were surveyed.

7/8. Post-smolt distribution and towed CTD data were collected. The successful use of the open ended trawl will make future post-smolt surveys more cost effective, non-destructive to the fish it encounters and will allow a more precise relation between post-smolt distribution and hydrographic variables to be determined.

9. Twenty carboys were filled with low nutrient seawater for QUASIMEME at 59°17.09'N 000°00.41'W.

10. 41 samples were taken as part of a pilot study in order to assess the concentration of free marine bio-toxins and other compounds in the environment. Eight of these were duplicates for quality control purposes.

11. Passive acoustic surveys for cetaceans were carried out in the Faroe-Shetland Channel from the *FRV Scotia* between 7 and 27 May 2005. Surveys were conducted using a towed hydrophone array (0.2-150 kHz). The hydrophone array was towed between standard hydrographic stations along Fair Isle-Munken and Nolso-Flugga standard hydrographic lines as well as in the North Sea, where travel time between stations exceeded 30 minutes. Towed array surveys were also carried out during transits between moorings deployment and recovery sites and between the salmon smolt trawls on the second half of the trip in the North Minch and shelf-edge waters. During the salmon smolt trawls, the keel-mounted hydrophone was monitored continuously; however this hydrophone was a lot less efficient, only detecting the loudest dolphin whistles and no sperm whale clicks. Around 170 hours of acoustic monitoring effort were carried out which corresponds to around 3,000 km. Two-minute listening stations were carried out each 15 minutes. In total, 674 listening stations were made. Sperm whales were detected in 3.9% of all stations (Fig. 1) and dolphin species were detected in 11.9% of all stations (Fig. 2). There were also two sightings, one of a group of pilot whales and unidentified dolphin species and another of a group of unidentified dolphin species. Recordings were automatically made for 30 seconds every two minutes together with long continuous recordings carried out when in the presence of whales or dolphins either vocalizing close to the vessel or emitting unusual sounds. The high frequency hum that was present during last year's cruises is no longer present.

Low frequency recordings (0.0001-0.2 kHz) were made using sonobuoys deployed at hydrographic stations in water depths greater than 300 m. Eleven sonobuoys were deployed. Post processing of these recordings will be carried out by René Swift in order to detect vocalizations of baleen whales.

It is planned that the towed hydrophone array data will be analysed by Sónia Mendes (Aberdeen University), and Clare Embling (Sea Mammal Research Unit) independently as part of their PhD research projects.

Throughout the cruise, sea surface temperature, salinity and fluorescence recordings were made using a Sea-Bird SBE21 Thermosalinograph and Sea Point Fluorometer. Surface samples were taken throughout the cruise to calibrate these data. Detailed results of the hydrographic data collected during the cruise will be made available as these data are worked up and interpreted in the laboratory. Calibrations were carried out on *Scotia* for both the thermosalinograph and CTD instrumentation.

Prior to the start of the cruise a faulty time was shown on the Zendiq display screens. The fault appeared to be coming from the NR230 (GPS). The AWE PC clock was altered to display the correct time on the display screens. After the first station on the JONSIS line the position displayed by Zendiq was also faulty. Again this information originated from the NR230. The NR230 was switched off and on again by the ETO and the Zendiq system rebooted this corrected the faulty display position, however, the time displayed was again incorrect. As above the, time on the display was altered by changing the AWE PC system clock.

G Slesser
22 June 2005

Seen in draft: P Barratt

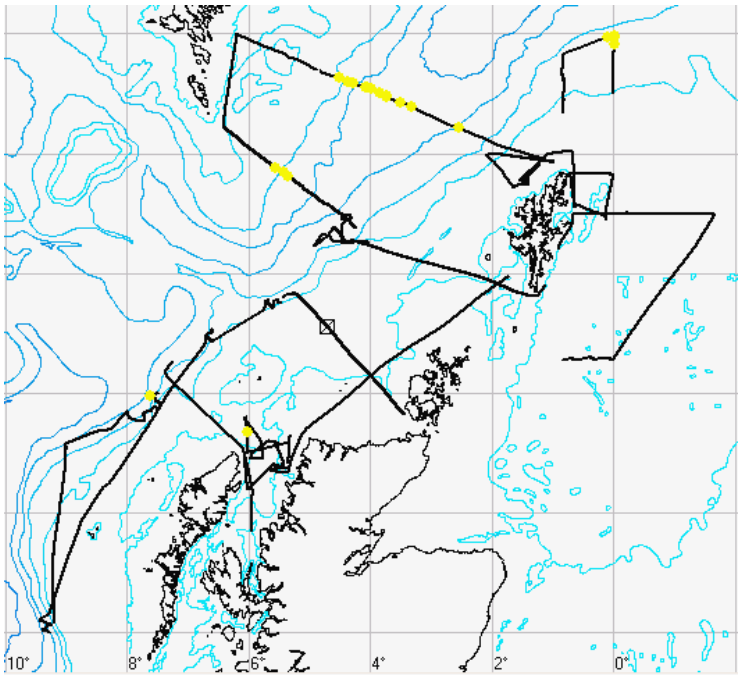

Figure 1 **Sperm whale locations (blobs) with survey effort (black line) during the May 2005 Scotia survey**

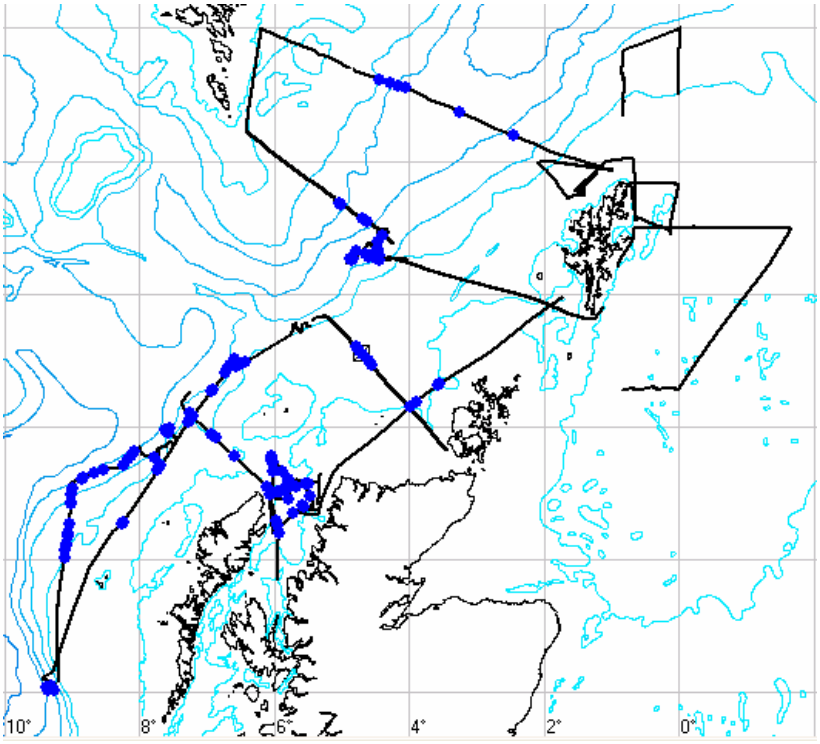

Figure 2 **Dolphin whistle locations (blobs) with survey effort (black line)**