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

FRV *Scotia*

Cruise 1306S

Report

22 August – 5 September 2006

Ports

Loading: Aberdeen

Unloading: Aberdeen

Personnel Exchange: Oban

Personnel

D Moore	22 Aug – 5 Sept
C Shand	22 Aug – 5 Sept
E Armstrong	22 Aug - 5 Sept
*N Collie	29 Aug – 5 Sept
*S O'Neill	22-29 Aug
*G Rodger	29 Aug - 5 Sept
*M McCann	22-29 Aug
*M Rose	22–29 Aug
*P Stainer	29 Aug - 5 Sept
*J Cooper	22–29 Aug
J Heron	22 Aug – 5 Sept
*C Greathead	22-29 Aug
*Eoghann MacLachlan (Visitor)	29 August only

*Embarked/Disembarked by small boat at Oban

Fishing Gear

BT 101 (with tickler chains)

Sampling Gear

TV sledge, grabs, sieve table and agassiz trawl. Liquid nitrogen will be carried.

Out-turn Project Codes

12 days AE02n and 3 days AE11d

Objectives

1. To undertake swathe bathymetry, grabbing and TV sledge survey/trials in Aberdeen Bay, off Balmedie and the Ythan.

2. To undertake swathe bathymetric, grabbing and TV sledge surveys at two of the EMEC renewable test sites in Orkney.
3. To undertake studies to investigate the impacts of wastewater discharge operations off Peterhead. Survey may include fishing, grabbing, water sampling, coring, TV sledge and swathe bathymetry.
4. To undertake a check monitoring survey within the MOD Outer Hebrides range, grabbing, TV sledge and swathe bathymetry.
5. To undertake sediment sampling, swathe bathymetry and TV surveys in the Firth of Lorne SAC.
6. To undertake bathymetric surveys of selected dredged spoil disposal sites, up to a maximum of six sites on the route from Aberdeen via Orkney and Shetland to Outer Hebrides. To map the seabed and to continue to ascertain the usefulness of this technique as a check monitoring tool for the future.
7. To collect flatfish from Aberdeen Bay and the Moray Firth for the measurement of DNA Damage; samples to be taken from scheduled trawls and analysis partly undertaken on board.
8. To collect field samples to assist in estimating the biochemical availability of organic contaminants in selected sediments containing apparently high concentrations of PAH, CBs, or PBDE's. Samples to be collected during other operations described above.
9. To undertake standard check monitoring duties, seabed sampling and underwater television, at selected dredged material disposal sites in Orkney, Shetland and Hebrides. Also the disused shellfish waste site in Orkney. (Contingency)
10. To identify potential new sea disposal sites off Shetland. Survey will include grabbing, trawling and TV sledge. (Contingency)
11. To survey potential disposal sites off the Banff and Buchan coast, swathe bathymetry and grabbing. (Contingency).

Narrative

Scientific equipment was loaded and set up prior to sailing on the morning of 22 August. The vessel departed from Aberdeen and proceeded to an area off Cove where a successful trawl was undertaken for flatfish. On completion of this work the vessel proceeded to sample the wastewater discharge site off Peterhead by grab and UWTV. A total of 12 grab stations were occupied and three TV transects run, the latter yielding 20 photographic frames. Survey work using the swathe bathymetry system, TV and grabs, was then conducted on the dredge disposal sites off Buckie and MacDuff before steaming to the Guillam Bank area where another trawl for flatfish was undertaken. Three attempts were required in order to acquire the requisite number of flatfish for analysis.

On completion Scotia sailed to Orkney, making observations and taking water samples in the area of the Beatrice Platform in connection with reports of fish kills in the area which seemed to centre on the installations. When the vessel arrived in Orkney a bathymetric survey was conducted in Eday Sound (24 August). In order to allow a more stable environment for the electrophoresis work associated with the COMET assay of the flatfish

obtained by earlier trawling, *Scotia* entered the Bay of Tuquoy, north of Eday Sound, where she remained in DP until the assay was finished. The vessel then sailed to the European Marine Energy Test Centre at Billia Croo where limited grab and television sampling was undertaken (25 August). The area was occupied by recently laid moorings and other underwater obstructions and their presence precluded the possibility of undertaking swathe bathymetry operations. Similar surveying was conducted at the two Stromness disposal sites off Hoy Mouth before the vessel sailed to survey the west coast sites at Loch Inchar, Lochinver (26 August) and Ullapool. Each site was surveyed using the usual techniques.

After the completion of this work *Scotia* sailed to Colonsay where a further trawl was taken for flatfish in the early hours of 27 August. The vessel then surveyed a number of swathe lines in the Firth of Lorne (Garvellachs) before returning to the waters around Colonsay to conduct test deployments of the TV sledge with a new configuration dependent on the use of an HID lamp. Having completed these tests *Scotia* returned to the swathe survey around the Garvellachs. Further TV tests were conducted in the evening of the 27 once minor modifications had been made to the sledge. During the afternoon of the 28 swathe operations were suspended for four hours to allow the vessel to sail into Loch Buie to permit electrophoresis analysis to be conducted in quiescent conditions. Full length lines to the west and east of the islands were completed before the vessels sailed to Oban on the morning of 29 August to exchange crew. A visiting fisherman from the area, Mr Eoghann MacLachlan of the *Rambling Rose*, also joined the vessel as an observer.

Once the exchange was completed, the vessel returned to the area of the Garvellachs where the final, partial, lines of the swathe survey (to the southwest of the islands) were run. In the time that the vessel was off station for the crew change the data collected from the survey of the area to the west of the Garvellachs was subjected to an analysis by the *Quester Tangent* software to give preliminary assessment of the bottom habitats. The results of this analysis directed the subsequent grabbing and the selection of the TV transects.

On completion of the work at the Garvellachs *Scotia* sailed to Oban and disembarked Mr MacLachlan at around midnight, after which passage was made to the west side of the Hebrides to the *Qinetic* range off Benbecula. Two locations were selected for swathe survey and work started at 1052 on 30 August. On completion of the swathe survey the area was ground truthed by the attempted collection of sediments and TV footage, guided by preliminary analysis of the swathe data by the *QTC* system. Work was completed in the early hours of 1 September and then passage was made to Loch Ewe to conduct trials on the vessels *Hipap* system.

These tests were completed successfully and *Scotia* departed Loch Ewe in the early evening. At the request of the Marine Laboratory water samples were collected on a transect out of the loch as part of investigations of a harmful algal bloom which had been reported in the area. The vessel then made passage for the Moray Firth where a second set of water samples were collected from the *Beatrice* area for comparison purposes (2 September).

A series of grab samples was obtained from the area of a known drill cuttings pile about 45km north east of Fraserburgh, along with 3 TV transects and two runs of the swathe system. Operations in this area were completed by 2300 and the ship then sailed to the area off the Ythan estuary where an intensive swathe survey was undertaken (3 September). When this was completed (early 4 September) operations then moved firstly to the Aberdeen dredge spoil disposal site and then to the location noted on the map as a munitions disposal site. Both these sites were subjected to swathe survey. Whilst these surveys were being conducted the data from off the Ythan was analysed using the *QTC* system and an area of the sea bed, considered as different from the rest of the surveyed

location, was identified at the south west corner of the survey area. Attempts to collect grab samples from this area were terminated due to a fault in the scientific winch system. Scotia then returned to Aberdeen where she docked late in the evening of 4 September.

Results

All the primary objectives of the cruise were achieved. In addition, disposal and cuttings pile sites in the Moray Firth and Orkney were surveyed and trials were conducted on novel TV survey methods and the use of the ship's Hipap system. Samples were also obtained from various locations to aid in the investigation of harmful algal blooms that had been observed around the Scottish coast.

The swathe system gathered large quantities of data which will require detailed analysis in Aberdeen to yield their full potential. However, during the course of the cruise graphical outputs of the bathymetry from the various survey instruments were made and these can be examined in the Environment Protection Group's offices.

Chemical and particle size samples have been submitted for analysis and the results will be available in due course.

Derek C Moore (SIC)
22 November 2006