

R1/12

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FRV *Scotia*

Cruise 0106S

REPORT

5–17 January 2006

Ports

Loading: Aberdeen
Unloading: Aberdeen

Personnel

A McIntosh (In Charge)
M Russell
C Megginson
M Rose
M McKenzie
E Dalgarno
G Packer

Fishing Gear: BT101 with tickler chains

Objectives

1. To undertake water, sediment and biological sampling for the National Marine Monitoring Programme (NMMP).
2. To collect water samples for hydrographic studies as part of the Scottish Coastal Eutrophication Assessment Survey (SCEAS).

Out-turn Days days per Project: 13 days 10124 (AE11p)

Narrative

After loading and securing all sampling and scientific equipment, *Scotia* sailed from Aberdeen at 1415 on 5 January 2006. Water sampling in support of the Scottish Coastal Eutrophication Assessment Survey (SCEAS) commenced at 1600 with the aim of collecting samples at 15 minute intervals for the duration of the cruise. Passage was made south to the east coast NMMP random stratified sampling sites where water and sediment were collected. Passage was continued south to Berwick, collecting samples for solid phase *in situ* extraction system (SPIES), chlorophyll and phytoplankton off the Firth of Forth, before heading to the offshore NMMP 165 site. Water, sediment and fishing were completed by 1000 on 6 January. Passage was then continued to the Fladen ground where, between 2200 on 6 January and 0400 on 8 January, sediment sampling was conducted at the four random stratified sampling sites. A

trawl was taken at the north west of the Fladen ground from which whiting and *Nephrops* were sampled for chemical analyses. *Scotia* then made passage for the Moray Firth where sediment sampling was conducted in 3 strata and at the NMMP sites 95 and 105 between 1130 on 8 January and 0500 on 9 January. A further set of water samples were taken for SPIES. Fishing was conducted near the NMMP 105 site which provided sufficient plaice to meet the chemistry requirements. After continuing with the SCEAS water sampling off the Caithness coast and due to expected inclement weather precluding work around Orkney and Shetland, passage was made with a view to working in the North Minch. Worsening weather prevented *Scotia* from rounding Cape Wrath until late evening on 9 January. Slow passage was made across the Minch where shelter was taken off Tolsta Head on 10 January. As the weather abated slightly, and in the lee of the land, a trawl was taken off Broad Bay before moving south along the east coast of Lewis to collect further water samples for SCEAS. Increasingly inclement weather prevented further passage south beyond Stornoway Bay and *Scotia* returned to shelter in Broad Bay overnight. A weather window was presented on the morning of 11 January and sediment samples were collected over a 16 hour period, from 0800, from the two random stratified sites in the North Minch. A proposed further trawl off the Gairloch coast in the early morning of 12 January had to be abandoned due to worsening weather. *Scotia* made slow passage south to shelter off Skye as the wind reached severe gale strength which was sustained during the following 12 hours. With an expected reduction in wind speed, it was decided, at 1700 to move south to see if sampling for sediment would be possible at the lower Minch random stratified stations. *Scotia* arrived at the first station around 2100. Over the next 9 hours, 4 sites were sampled before abandoning further attempts due to worsening weather and safety considerations in relation to handling the sampling gear. Passage was then made north to Broad Bay/Tolsta Head where 2 trawls were completed by 2000 on 13 January returning a total of 40 plaice. *Scotia* then made passage towards Cape Wrath, heading for Orkney and Shetland, continuing the SCEAS water sampling programme before arriving off the east Shetland mainland where sediment from the random stratified site was sampled between 1645 and 1930. Passage was then made to the south west random stratified sediment sampling location off Burra Haaf which was completed by 0520 on 15 January. Passage was then continued north and the proposed trawl to be taken off the north east corner of Shetland at Unst was not possible due to severe weather precluding this activity. Passage was made south to collect the remaining water samples for SCEAS around Orkney before heading south to the Moray coast to complete the random stratified sediment sampling from one station and collect water samples for SCEAS along the Moray coast and around Dunnet Head before heading for Aberdeen where docking was completed by 0100 on 17 January. All biological samples and scientific equipment were unloaded and returned to the Marine Laboratory on the morning of 17 January.

Results

A total of 912 water samples were taken in support of the Scottish Coastal Eutrophication Assessment Survey (Fig. 1). Sampling at four of the Scottish NMMP offshore sites (165, 95, 105 and 85) was successfully completed. The random stratified sampling on the East coast, Fladen, Moray Firth, North Minch and Shetland was also successfully completed as detailed in Table 1. Sampling was only possible at 4 sites in the south Minch due to adverse weather precluding completion at this location.

Water sampling for SPIES (solid phase *in situ* extraction system), chlorophyll and phytoplankton, on behalf of the BAM group, was carried out according to the protocols provided at locations off the Firth of Forth, in the Moray Firth and the North Minch.

All water samples for SCEAS and NMMP were analysed on board FRV *Scotia* for total oxidised nitrogen, phosphate and silicate and 205 were analysed for ammonia.

Protein concentration was determined on the homogenised livers from all fish samples and OH-pyrene fluorescence equivalents determined in some bile samples.

Despite experiencing some very poor weather during this cruise, the objectives were successfully completed, with only 6 out of 70 sediment samples missed, thanks to the excellent co-operation of the officers and crew of *Scotia* and the scientific staff.

A McIntosh
24 January 2006

Seen in draft: Angus Macleod, OIC *Scotia*

TABLE 1

NMMP Site	Water samples (nutrients TON, phosphate, silicate and ammonia analyses)	Sediment Chemistry (PAH, CB, BFR, trace metals, PSA, TOC)	Macrobenthos	Fish Chemistry Chemistry (PAH, CB, BFR, trace metals) and biological effects (EROD and PAH bile metabolites)
	18 NMMP and 912 samples in support of SCEAS			
East Coast random stratified	1 x 5 m from surface, 5 m from bottom	5 samples	5 samples (1 mm sieved fraction)	
NMMP 165 (Montrose Bank)	1 x 5 m from surface, 5 m from bottom	3 (out of 5) samples		5 pools of 5 <i>Limanda limanda</i> (chemistry) 25 samples for EROD and bile metabolites
Fladen ground random stratified	1 x 5 m from surface, 5 m from bottom from each of 4 strata	5 samples from each of 4 strata	5 samples from each of 4 strata (1 mm sieved fraction)	5 pools of 5 whiting liver and flesh (chemistry) 25 samples for EROD and bile metabolites 2 pools of <i>Nephrops</i> tails (chemistry)
Moray Firth random stratified	1 x 5 m from surface, 5 m from bottom from each of 3 strata	5 samples from each of 3 strata	5 samples from each of 3 strata (1 mm sieved fraction)	
NMMP 95 (Intermediate Moray Firth)	1 x 5 m from surface, 5 m from bottom	5 replicates		
NMMP 105 (Outer Moray Firth)	1 x 5 m from surface, 5 m from bottom	5 replicates		5 pools of 5 plaice liver and flesh (chemistry) 25 samples for EROD and bile metabolites
North Minch random stratified	1 x 5 m from surface, 5 m from bottom from each of 2 strata	5 samples from each of 2 strata	5 samples from each of 2 strata (1 mm sieved fraction)	
(NMMP 85) Minch (2 trawls taken)	1 x 5 m from surface, 5 m from bottom	3 (out of 5) samples		10 pools of 5 plaice liver and flesh (chemistry) 50 samples for EROD and bile metabolites
South Minch random stratified	1 x 5 m from surface, 5 m from bottom	4 samples (remaining 6 not possible due to adverse weather)	4 samples (1 mm sieved fraction)	
Shetland east coast random stratified	1 x 5 m from surface, 5 m from bottom	5 samples	5 samples (1 mm sieved fraction)	
Shetland west coast random stratified	1 x 5 m from surface, 5 m from bottom	5 samples	5 samples (1 mm sieved fraction)	

0106S (5 - 17 January 2006) cruise track and sampling locations

