

R1/12

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FRV *Scotia*

Cruise 0109S

REPORT

6-21 January 2009

Loading: Aberdeen

Unloading: Aberdeen

Personnel

M Russell (SIC)

A McIntosh

G Slessor

M Rose

M McKenzie

E Dalgarno

G Packer

D Watson

Fishing gear: BT 101 with tickler chains; Day grab

Objectives

1. To undertake water, sediment and biological sampling for the Clean Seas Environmental Monitoring Programme (CSEMP).
2. To collect water samples for nutrient studies as part of the Scottish Coastal.
3. Eutrophication Assessment Survey (SCEAS).
4. Undertake CTD profile, phytoplankton and water samples for chlorophyll a and nutrients in support of WFD coastal phytoplankton monitoring programme, AE11t.
5. Sediment and biota from Irvine Bay, biota from offshore Pladda for CSEMP and CTM, biota and sediment from Colonsay for CSEMP and CTM.
6. Collect additional sediment samples for SEPA from Aberdeen spoil ground and Shetland.
7. Undertake CSEMP sediment sampling in the Firth of Forth for SEPA.

Days Per Project: 13 days AE11p; 3 days AE11t

Narrative

FRV *Scotia* sailed from Aberdeen at 1100 hrs on 6 January. Sampling commenced at 1410 hrs in respect of the Scottish Coastal Eutrophication Assessment Survey (SCEAS) objective with water samples being taken every 15 minutes throughout the cruise. The WFD sites at the Ythan and Peterhead were sampled before passage to the Fladen Ground where sediment sampling commenced at 2300 hrs on 6 January. The twelve stratified random sites were completed by 2145 hrs on 7 January. Two trawls for nephrops were undertaken and at 0100 hrs on 8 January passage to the Moray Firth commenced as the weather forecast precluded proceeding to the Shetland sites.

In the Moray Firth sampling commenced at 0845 hrs on 8 January. Fifteen stratified random and two fixed sites were completed, with one trawl at NMMP105 and 2 trawls at NMMP95. The vessel finished trawling at around 0915 hrs on 9 January. The weather forecast for the North Coast and Minches was poor therefore the decision was taken to leave the WFD sites at Wick, Dounreay and Eriboll for the return leg and to proceed to the Minches with all speed.

The weather deteriorated quickly and as we left the shelter of the North Coast at around 2030 hrs on 9 January SCEAS water sampling was reduced to half hourly intervals as our speed decreased to < 5 knots. The weather deteriorated even further and SCEAS water sampling was suspended at 2230 hrs. Arrived off Isle of Lewis at 0400 hrs on 10 January and proceeded to Broad Bay for shelter, where we sheltered from a severe gale all day. Weather abated slightly in the evening and we left Broad Bay at 2100 hrs to attempt the North Minch NMMP85 trawling. There were no plaice in the first trawl therefore the vessel proceeded to a second site to the west where two trawls were required to get sufficient plaice. Trawling was completed at 0150 hrs and we returned to Broad Bay for shelter as the weather deteriorated once again. Sheltered in Broad Bay from 0230 hrs on 11 January till 0430 hrs on 12 January. Commenced grabbing in the Minches at 0650 hrs, completing the 5 sites in the North Minch by 1630 hrs and the 5 sites in the South Minch by midnight on 12 January. North Minch, Torridon and Inner Sound WFD sites were also sampled. The DP system failed at 0830 hrs on 12 January and was effectively out of commission for the rest of the cruise. This had no significant effect on sampling operations.

Sediment grabbing commenced in the Sea of Hebrides at 0645 hrs on 13 January and was completed at 1945 hrs on 13 January. Proceeded to Colonsay where two trawls and 3 sediment grabs were completed by 0430 hrs on 14 January. Passage was then made to the Solway Firth, where trawling commenced at 1800 hrs on 14 January. The fixed sediment site positions supplied by SEPA were in too shallow water for the *FRV Scotia* therefore 4 random sites were sampled as a back up. Sediments were also collected from NMMP25 and grabbing was complete by 2130 hrs on the 14 January.

The Irvine Bay site was reached at 0800 hrs on the 15 January. Trawling and grabbing (3 grabs) were completed by 1300 hrs. During this sampling transfer of fish collected from the Bowling sample site was made from the SEPA vessel *Sir John Murray*. *FRV Scotia* then proceeded to the Pladda trawl site. Poor weather precluded getting in to the near shore trawl position and in worsening conditions a trawl was carried out slightly further offshore. No fish were obtained and a decision was made to abandon the trawling at 1630 hrs on the 15 January and make passage back up the west coast to Eriboll to pick up the WFD site there. Arrived at Eriboll at 1845 hrs on 16 January, then proceeded to Dounreay where sampling was complete by 2200 hrs on 16 January.

Passage was made around the Orkneys, carrying out SCEAS sampling – the weather was too poor and deteriorating to continue to Shetland, therefore the Shetland CSEMP sites were not sampled, nor was the Lerwick sampling for SEPA completed. *FRV Scotia* continued down the east coast of the Orkneys in steadily worsening weather, reaching the Wick WFD site at 1300 hrs on the 17 January. This was completed by 1320 hrs and we headed south to the Moray coast to shelter, reaching Spey Bay at 1830 hrs, where we sheltered until 0815 hrs on 18 January.

The vessel made passage to the WFD site at Montrose then continued to the East Coast sediment sites where grabbing commenced at 1830 hrs on the 18 January. Grabbing was completed at 2235 hrs and *Scotia* continued to NMMP165 (Montrose Bank) where grabbing was completed by 0210 hrs on 19 January. Trawling at this site completed by 0330 hrs and passage was made to the Berwick WFD site, which was reached at 0850 hrs on 19 January. The vessel then headed for the Firth of Forth where 5 sites were sampled for SEPA. An additional 8 CTD sites were also sampled by G Slessor. The vessel then headed for the Isle of May WFD site and all were completed by 2100 hrs on 19 January.

Final WFD sites at East of the Eden and St Andrews were completed by 0015 hrs on the 20 January. Passage was made towards Aberdeen, with a further additional line of CTD sites conducted off Stonehaven. These were completed by 1230 hrs on 20 January and the vessel then carried on to the Aberdeen Disposal Ground where 5 sites were sampled for benthos and ecotoxicology on behalf of SEPA. This was completed by 1630 hrs and *FRV Scotia* berthed at 1730 hrs in Aberdeen on 20 January.

Results

All objectives were completed with the exception of the Shetland sampling, which was abandoned due to poor weather. A summary of the completed objectives is given in Tables 1 and 2. The cruise track is shown in Figure 1.

A total of 1200 samples were analysed for the nutrients TOxN, phosphate, silicate, nitrite and ammonia.

100 chlorophyll samples were filtered at sea.

Over 185 bile fish were analysed for biological effects during the cruise. Additional fish were processed to give a stock of fish muscle and liver for the validation of chemical methods. Additional fish (mostly whitebait) were collected and frozen for the FRS Aquarium.

68 sediments for chemical analyses and 62 for benthic analysis were also collected. In addition 45 bags of sediment were collected for C Robinson.

CTD data was transmitted to BOCD at regular intervals for onward transmission to the Met Office for weather forecasting purposes. Two extra CTD lines were processed – in the Firth of Forth and off Stonehaven.

Litter content of each trawl was monitored and recorded throughout the cruise. Data will be forwarded to the Marine Conservation Society.

Despite experiencing some very poor weather during this cruise, the objectives were completed successfully thanks to the excellent co-operation of the officers, crew and scientific staff.

M Russell
3 March 2009

Seen in draft:
Captain R Jowett, OIC, *FRV Scotia*

Table 1 CSEMP sampling

CSEMP Site	Water samples (nutrients TOxN, phosphate, silicate, nitrite and ammonia analyses)	Sediment Chemistry (PAH, CB, BFR, trace metals, PSA, TOC)	Macroben- tes (1mm sieved fraction)	Fish Chemistry Chemistry (PAH, CB, BFR, trace metals) and biological effects (EROD and PAH bile metabolites)
Continuous water sampling in support of SCEAS				
East Coast stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom	5 samples	5 samples	-
NMMP 165 (Montrose Bank)	CTDF: 1 x 5 m from surface, 5 m from bottom	1 sample	-	5 pools of 5 fish
Fladen ground stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom from each of 4 strata	3 samples from each of 4 strata	3 samples from each of 4 strata	Nephrops
Moray Firth stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom from each of 2 strata	5 samples from stratum 1, 10 from stratum 2	5 samples from stratum 1, 10 from stratum 2	-
NMMP 95 (Intermediate Moray Firth)	CTDF: 1 x 5 m from surface, 5 m from bottom	1 sample	-	5 pools of 5 fish Fishing site
NMMP 105 (Outer Moray Firth)	CTDF: 1 x 5 m from surface, 5 m from bottom	1 sample	-	5 pools of 5 fish
North Minch stratified random	CTDF: 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	5 pools of 5 fish
NMMP 85 (North Minch)	CTDF: 1 x 5 m from surface, 5 m from bottom	1 sample	-	5 pools of 5 fish
Colonsay		3 samples		5 pools of 5 fish
Sea of Hebrides stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom	10 samples	10 samples	
Outer Firth of Clyde	(already sampled)	(already sampled)	(already sampled)	Not completed due to weather conditions
Irvine Bay		3 samples	-	5 pools of 5 fish
Solway Firth stratified fixed	CTDF: 1 x 5 m from surface, 5 m from bottom	5 samples	5 samples	5 pools of 5 fish
Shetland east coast stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom	Not completed due to weather conditions		
Shetland west coast stratified random	CTDF: 1 x 5 m from surface, 5 m from bottom	Not completed due to weather conditions		
Shetland northeast coast				Not completed due to weather conditions

Table 1 (cont)

Shetland Offshore (on behalf of SEPA)			
Hawk's Ness	Not completed due to weather conditions		
Lerwick UWWTD Site F			
Lerwick Benthic sample site 2			
Lerwick Benthic sample site 17			
Lerwick UWWTD Site F			
Aberdeen Spoil disposal Ground on behalf of SEPA			
5 PSA /CHN			
5 benthos			
5 ecotoxicology			
2 RSA			
Firth of Forth on behalf of SEPA			
	Sediment Chemistry (PAH, CB, BFR, trace metals, PSA, TOC)	Macrobenthos (1mm sieved fraction)	
Firth of Forth at Fairway Buoy	1 sample	1 sample	
Firth of Forth Spatial Survey Station 49	1 sample	1 sample	
Firth of Forth Spatial Survey Station 42	1 sample	1 sample	
Firth of Forth Spatial Survey Station 38	1 sample	1 sample	
Firth of Forth Spatial Survey Station 33	1 sample	1 sample	

Table 2 Coastal water bodies sampling

Sampling Site	Plankton		Supporting determinands			
	Lund Tube	Vertical Haul	CTDF	Nutrients	Lund Tube Chl a	Chl a validation
Montrose	Sample	Sample	Data	Data	Data	Data
Ythan	Sample	Sample	Data	Data	Data	Data
Peterhead	Sample	Sample	Data	Data	Data	Data
Burghead	Sample	Sample	Data	Data	Data	Data
Cromarty Firth	Sample	Sample	Data	Data	Data	Data
Wick	Sample	Sample	Data	Data	Data	Data
Dounreay	Sample	Sample	Data	Data	Data	Data
Eribol	Sample	Sample	Data	Data	Data	Data
Inner Sound	Sample	Sample	Data	Data	Data	Data
N Minch	Sample	Sample	Data	Data	Data	Data
Sea of Hebrides	Sample	Sample	Data	Data	Data	Data
St Andrews	Sample	Sample	Data	Data	Data	Data
Isle of May	Sample	Sample	Data	Data	Data	Data
Berwick on Tweed	Sample	Sample	Data	Data	Data	Data
East of Eden	Sample	Sample	Data	Data	Data	Data
Torridon	Sample	Sample	Data	Data	Data	Data

Figure 1 Cruise track for 0109s

