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FRV *Scotia*

Cruise 0112S

## **PROGRAMME**

5-20 January 2012

**Loading:** Aberdeen

**Unloading:** Aberdeen

In setting the survey programme and specific objectives, etc the Scientist-in-Charge needs to be aware of the restrictions on working hours and the need to build in adequate rest days and rest breaks as set out in Marine Scotland's Working Time Policy (Lab Notice 34/03). In addition, the Scientist-in-Charge must formally review the risk assessments for the survey with staff on-board before work is commenced.

In the interest of efficient data management it is now mandatory to return the survey report, to I Gibb and the Survey Summary Report (old ROSCOP form) to M Geldart, within four weeks of a survey ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

## **Personnel**

M Russell (SIC)  
N Aldridge  
E Dalgarno  
P Dymond  
K McNeish  
G Packer  
C Robinson  
P Stainer

**Estimated Days Per Project:** 13 days ST03n, 1 day STO3q , 2 days ST002.

**Fishing gear:** BT 101 with tickler chains;

**Sediment Sampling:** Day grab and sieves;

**Litter sampling:** bongo and neuston nets.

## **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 Eutrophication Assessment Survey (SCEAS).
3. Undertake CSEMP sediment sampling in the Firth of Forth for SEPA.

4. Undertake WFD biological sampling at 3 sites for SEPA (Cromarty Firth, the Minch North, Sea of Hebrides).
5. WFD sediment sampling for SEPA - off Lerwick and at Hilton of Cadboll sites.
6. Undertake additional fish sampling for integrated assessment ROAME.
7. Monitor and record all litter brought aboard in all trawls. Sample water column and sediment for microplastic litter.

## **Procedure**

After departing Aberdeen and completing all relevant drills and training the vessel will steam to the start point of the survey which will be decided in consultation with the officers onboard and taking forecast maps into consideration.

At the 4 CSEMP fixed sites (NMMP85, NMMP95, NMMP105, NMMP165) sediment and fish will be sampled.

Stratified random samples of sediment will be taken from one stratum on the East coast, four strata in the Fladen Ground, two strata in the Moray Firth, two strata in the North Minch and one stratum in the Sea of Hebrides (Table 1; Figure 1). Fish sampling will be carried out within these strata, except for the Sea of Hebrides (Table 1).

Sediments will be sampled for chemical analyses at all locations. Sediment will be sieved for macrobenthos analysis only at the stratified random sampling locations. Fish will be sampled for biological effects measurements and chemical analyses. Some biological effects measurements will be carried out during the cruise.

Additional sampling will be carried out at 5 sites in the Firth of Forth, in support of CSEMP sampling for SEPA (Table 2). Five sites off Lerwick will be sampled for SEPA, for benthos only (Table 2). Five sites at Hilton of Cadboll will also be sampled for SEPA for benthos only (Table 2). Sampling in support of WFD for SEPA (phytoplankton/nutrients and chlorophyll) will be carried out at three sites (see Table 3).

Surface water will be collected for hydrographic nutrient studies (SCEAS) throughout the cruise at fixed time intervals. Nutrient samples will be appropriately stored throughout the cruise and returned to the laboratory for analyses.

In support of the Integrated Assessment ROAME both plaice and dab will be sampled, if present, in the outer Moray Firth, Montrose Bank, Shetland, North Minch and the Fladen Ground.

Dab identified as possibly being infected with protozoan parasites will be sampled in the Moray Firth on behalf of Stirling University (M Freeman). Samples identified as such will be dissected and preserved for return to the laboratory.

Monitoring of all litter brought on board during trawling operations will continue throughout the cruise. Testing of the sampling equipment for microplastics in the water column will be carried out in each of the fishing areas. Sites will be these will be within the CSEMP cruise track and

will be defined in advance. Additional sediment samples will also be taken at all sites sampled for microplastics in the water column.

Weather and time permitting extra sediment will be collected to provide a chemistry laboratory reference material.

Liquid nitrogen and formaldehyde will be carried aboard for the preservation and storage of biological material.

Normal contacts will be maintained with the laboratory.

Submitted:  
*M Russell*  
12 December 2011

Approved:  
*I Gibb*  
12 December 2011

**Table 1: CSEMP Sampling**

<b>CSEMP Site</b>	<b>Water samples</b> (nutrients TOxN, phosphate, silicate, nitrite and ammonia analyses)	<b>Sediment Chemistry</b> (PAH, CB, BFR, trace metals, PSA, TOC)	<b>Macrobenthos (1mm sieved fraction)</b>	<b>Fish Chemistry</b> Chemistry (CB, BFR, trace metals) and biological effects (EROD and PAH bile metabolites)
Continuous water sampling in support of SCEAS				
East Coast stratified random		5 samples	5 samples	-
NMMP 165 (Montrose Bank) 56°30.00'N 001°30.00'W		1 sample	-	5 pools of 5 plaice## 56 30.00N 001 30.00W
Fladen ground stratified random		3 samples from each of 4 strata	3 samples from each of 4 strata	5 pools of 5 fish## Approx fish site position 59 12.00N 001 27.00W
Moray Firth stratified random		5 samples from stratum 1, 10 from stratum 2	5 samples from stratum 1, 10 from stratum 2	-
NMMP 95 (Intermediate Moray Firth) 57°40.00'N 003°49.00'W		1 sample	-	5 pools of 5 plaice Fishing site 57 53.00N 003 39.48W
NMMP 105 (Outer Moray Firth) 58°03.00'N 003°00.00'W		1 sample	-	5 pools of 5 fish## Fishing site 58 03.00N 003°00.00'W
North Minch stratified random		5 samples from each of 2 strata	5 samples from each of 2 strata	
NMMP 85 (North Minch ) 58°00.00'N 005°40.00'W		1 sample	-	5 pools of 5 plaice## Fishing site 58 23.00N 005 58.00W
Sea of Hebrides stratified random		10 samples	10 samples	
Shetland east coast stratified random		5 samples	5 samples	-
Shetland west coast stratified random		5 samples	5 samples	
Shetland northeast coast (Balta)				5 pools of 5 plaice## 60 46.19N 000 37.58W

## extra fish sampling for dab at these sites for the integrated assessment ROAME.

**Table 2: Sampling for SEPA**

<b>Lerwick (on behalf of SEPA)</b>		
<b>WFD Site</b>	<b>Benthos PSA</b>	<b>Macrobenthos (1mm sieved fraction)</b>
Hawk's Ness	1 sample, PS only	1 sample
Lerwick UWWTD Site F	1 sample, PS only	1 sample
Lerwick Benthic sample site 2	1 sample, PS only	1 sample
Lerwick Benthic sample site 17	1 sample, PS only	1 sample
Lerwick UWWTD Site F	1 sample	1 sample
<b>Hilton of Cadboll (on behalf of SEPA)</b>		
<b>WFD Site</b>	<b>Benthos PSA</b>	<b>Macrobenthos (1mm sieved fraction)</b>
Alt Cromarty 1	1 sample, PS only	1 sample
Cromarty 2	1 sample, PS only	1 sample
Cromarty 3	1 sample, PS only	1 sample
Cromarty 4	1 sample, PS only	1 sample
Cromarty 5	1 sample, PS only	1 sample
Alt Cromarty 2	1 sample, PS only	1 sample
Alt Cromarty 3	1 sample, PS only	1 sample
Cromarty 6 (only if required to make up 5 sites)	1 sample, PS only	1 sample
<b>Firth of Forth (on behalf of SEPA)</b>		
<b>CSEMP Site</b>	<b>Sediment Chemistry (organics, metals, TOC and PS)</b>	<b>Macrobenthos (1mm sieved fraction)</b>
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 3: WFD Sampling (phytoplankton) on behalf of SEPA**

Sampling Programme Summary			Biological samples			Supporting determinands and samples			
Site Name	Latitude	Longitude	Plankton Lund Tube	Plankton Lund Tube	Plankton (63µm) Vertical Haul	S‰ & T 1, 5 & 10m	Nutrients 1, 5 & 10m and from Lund tube	Chlorophyll 1, 5, 10m depth	Lund Tube Chlorophyll sample
			250ml brown glass bottle	30ml sterilin tube	30ml sterilin tube				
			Lugol's Iodine	Lugol's Iodine	Formalin			chl filtrand: freeze	chl filtrand: freeze
<b>Minches North Sea of Hebrides</b>	<b>58 2.04N</b>	<b>005 40.80W</b>	sample	sample	sample	Yes	data	data	data
<b>CSPN44</b>	<b>56 51.01N</b>	<b>006 27.72W</b>	sample	sample	sample	Yes	data	data	data
	<b>57 41.00N</b>	<b>003 55.90W</b>	sample	sample	sample	Yes	data	data	data

**Figure 1:** Sediment and fish sampling sites for 0112s (includes all back up sites in addition to the primary sites). Water sampling will continue at predefined intervals throughout the cruise.

