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MRV *Scotia*

Survey 0116S

PROGRAMME

5 – 20 January 2016

Loading: Aberdeen, 23 December 2015
Sailing: Leith, 5 January 2016, (Scientific crew will join on 05/01/16)
Unloading: Aberdeen, 20 January 2016

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)
E. Dalgarno
K. MacNeish
G. Packer
C. Robinson
N. Shepherd
A. Taylor
A. Madgett (PhD student RGU/MSS)

Fishing gear: BT 101 with tickler chains; flats and rockhopper ground gear;
Sediment Sampling: Day grab and sieves;
Litter sampling: Catamaran neuston trawl; Plankton net;
Water sampling: Aquatracka fluorometer, Seabird 19 and sled

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. Monitor and record all litter brought aboard in all trawls. Sample water column and sediment for micro-plastic litter.

4. Collect seawater samples off Mingulay for Ocean Acidification ROAME.

5. Collect and process samples for Candyfloss programme.

6. Deploy Aquatracka and Seabird 19 to collect fluorescence data.

7. Phytoplankton sampling for student project

Estimated Days Per Project: 14 days ST03n; ½ day ST012; 1½ days ST014.

Procedure

After departing Leith and completing appropriate drills, the SIC will liaise with the ships master to prioritise the working areas outlined below with updated weather forecast information.

Surface water will be collected for hydrographic nutrient studies (SCEAS) throughout the survey at fixed time intervals. Nutrient samples will be analysed onboard. Any remaining will be appropriately stored and returned to the laboratory for analyses. Water samples will be taken off Mingulay in support of the Ocean Acidification ROAME (Fig 1). Water samples will be collected for the Candyfloss programme once per day and processed onboard.

Fish sampling will be carried out at Montrose Bank, Inner Moray Firth, Outer Clyde and Solway. It is proposed to carry out fish sampling in the Rockall and Bailey areas if weather allows a sampling window. If these areas are fished then the Solway fishing and sediments will be dropped. An alternative fishing area is the Faroe-Shetland Channel.

Sediment sampling will be carried out at Outer Forth, East Coast, Inner and Outer Moray Firth, East Shetland, the Minch North, the Minch South, Sea of Hebrides, Outer Clyde and the Solway. Sediment sampling will also be carried out at the four CSEMP fixed sites (NMMP85 – North Minch, NMMP95 – Inner Moray Firth, NMMP105 – Outer Moray Firth, NMMP165 – Montrose Bank).

A limited investigation of potential sediment sampling areas will be carried out in the Rockall and Bailey sea areas (weather permitting – see above). If fishing is carried out in the Faroe-Shetland Channel then sediment samples will also be collected.
Sediments will be sampled for chemical analyses at all locations. Fish will be sampled for biological effects measurements and chemical analyses. Some biological effects measurements will be carried out during the survey. Phytoplankton, zooplankton and fish will be collected by the PhD student at suitable sites.

Monitoring of all litter brought on board during trawling operations will continue throughout the survey. The catamaran will be deployed to sample for micro-plastics whenever possible and samples processed onboard as far as possible. Additional sediment samples will also be taken for micro-plastics where possible.
The Aquatracka and Seabird 19 will be deployed at suitable points throughout the survey.

Sediment will be collected to provide a chemistry laboratory reference material. Where possible if sufficient suitable fish not required for other studies are obtained during trawling livers will be sampled for a reference material.

General Arrangements

Liquid nitrogen and formaldehyde will be carried aboard for the preservation and storage of biological material. A full list of chemicals to be carried is attached.

Normal contacts will be maintained with the laboratory.

Submitted:
M. Russell
7 December 2015

Approved:
I. Gibb
8 December 2015

Table 1 Sampling

Station	**Water samples** (nutrients TOxN, phosphate, silicate, nitrite, and ammonia analyses)	**Sediment Chemistry** (PAH, CB, PBDE, trace metals, PSA, TOC)	**Fish Chemistry** Chemistry (CB, PBDE, trace metals) and biological effects (EROD and PAH bile metabolites)
Continuous water sampling in support of SCEAS	Continuous hourly sampling		
Mingulay Site	5 and 20 m and 20 m from bottom		
Outer Forth		2 samples	
East Coast		5 samples	
NMMP 165 (Montrose Bank)		1 sample	5 pools of 5 fish
Moray Firth (2 strata)		15 samples	
NMMP 95 (Int. Moray Firth)		1 sample	5 pools of 5 fish
NMMP 105 (Outer Moray Firth)		1 sample	
East Shetland		5 samples	
North Minch stratified random		5 samples	
South Minch stratified random		5 samples	
NMMP 85 (North Minch)		1 sample	5 pools of 5 fish
Sea of Hebrides stratified random		10 samples	
Outer Clyde		5 samples	5 pools of 5 fish
Solway		5 samples	5 pools of 5 fish
Faroe-Shetland Channel		5	5 pools of 5 fish, new site, weather permitting
Bailey		Possible sites	5 pools of 5 fish, new site, weather permitting
Rockall Plateau		Possible sites	5 pools of 5 fish, new site, weather permitting

*Proposed but very weather dependent

Figure 1: 0116S Sampling Areas

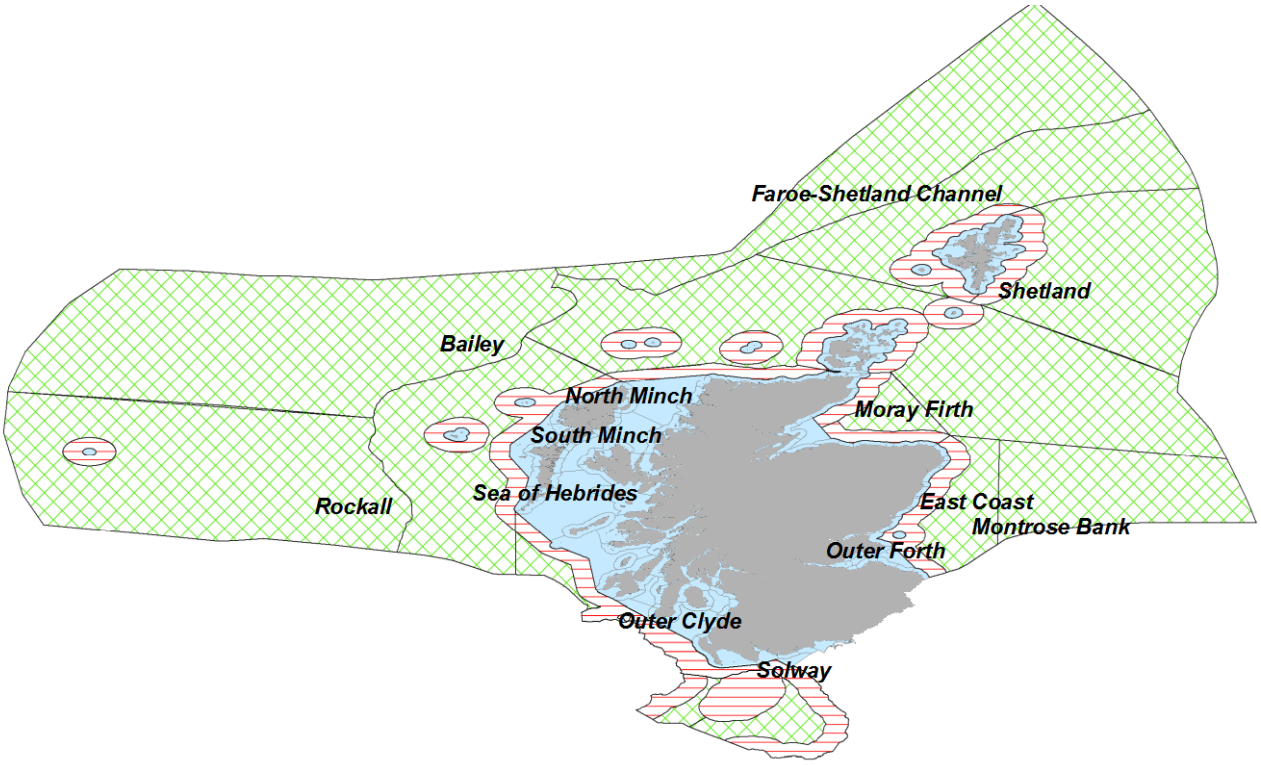

Table 3 Chemicals for survey

Liquid nitrogen
10% Buffered Formalin
48% Ethanol
Hydroxypyrene
Methanol
Heparin
Aprotanin
MS 222
Homogenising buffer (Ethylenediaminetetra-acetic acid (EDTA; disodium salt), Dithiothreitol, 0.2M di-Potassium hydrogen orthophosphate 3-hydrate, 0.2M Potassium di-hydrogen orthophosphate, 0.3M Potassium Chloride)
Dichloromethane
IMS
Formaldehyde
Lugols solution
Decon