Not to be cited without prior reference to Marine Scotland Marine Laboratory, Aberdeen

MRV *Scotia*

Survey 0120S

PROGRAMME

6-21 January 2020

Loading: Aberdeen, 22 December 2019
Sailing: Leith, 06 January 2020,
Unloading: Aberdeen, 21 January 2020

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

Fishing gear: BT 137 with Ground gear E;
Sediment Sampling: Day grab;
Litter sampling: Catamaran and neuston trawl;
Water sampling: Aquatracka fluorometer, Seabird 25 and modified acoustic sledge

Objectives

1. To undertake water, sediment and biological sampling for the Clean Seas Environmental Monitoring Programme (CSEMP).

2. Monitor and record all litter brought aboard in all trawls. Sample water column and sediment for micro-plastic litter. Collect fish guts and any other biota of interest for microplastic research.

3. If possible, deploy Aquatracka and Seabird 25 to collect fluorescence data.

Estimated Days Per Project: 12 days 20461; 2 days 20463; 2 days 20234.

Procedure

Scientific staff will join the vessel on 05 January 2020 to conduct final set-up of scientific equipment. After required drills, the vessel will depart Leith (am) on 06 January and head for the nearest sampling station as agreed with the master and fishing master. The order in which sampling stations will be undertaken will be agreed on a daily basis and in line with current weather conditions.
Fish sampling for biological effect assessment will be carried out at multiple locations detailed below (Table 1).

Table 1: Fishing locations.

Region	Fishing Location	Target Species
Solway	IrishSea_BalcaryPoint_fi01	dab
Pladda	Clyde_SouthArran_fi01	dab
Colonsay	MinchMalin_Colonsay_fi01	dab
Outer Moray fixed site 105	MorayF_MoFOpenSea_fi01	dab/plaice
Montrose Bank fixed site 165	EScotland_EScOpenSea_fi01	dab
Outer Forth	Forth_FirthFOuterOffshore_fi01	dab
Hebrides	Hebrides_HebIntermediate_fi01	dab
Inner Moray 95	MorayF_MorayFirthOffshor_fi01	dab/plaice
NEW Central Minch (3)	NA	dab
NEW North of Coll	NA	dab
NEW West Orkney (1)	NA	dab

Due to a lack of sites in certain sampling regions, new sites (in red in Table 1) will be tested and assessed for the collection of dab (in Central Minch, North of Coll and West of Orkney). If successful, the target species will be sampled for biological effect assessment and chemistry analysis.

Fish will be sampled for chemical analyses, biological effects and fish diseases (Table 2). Some biological effects measurements will be carried out during the survey.

Table 2: Fish sample preparation requirements.

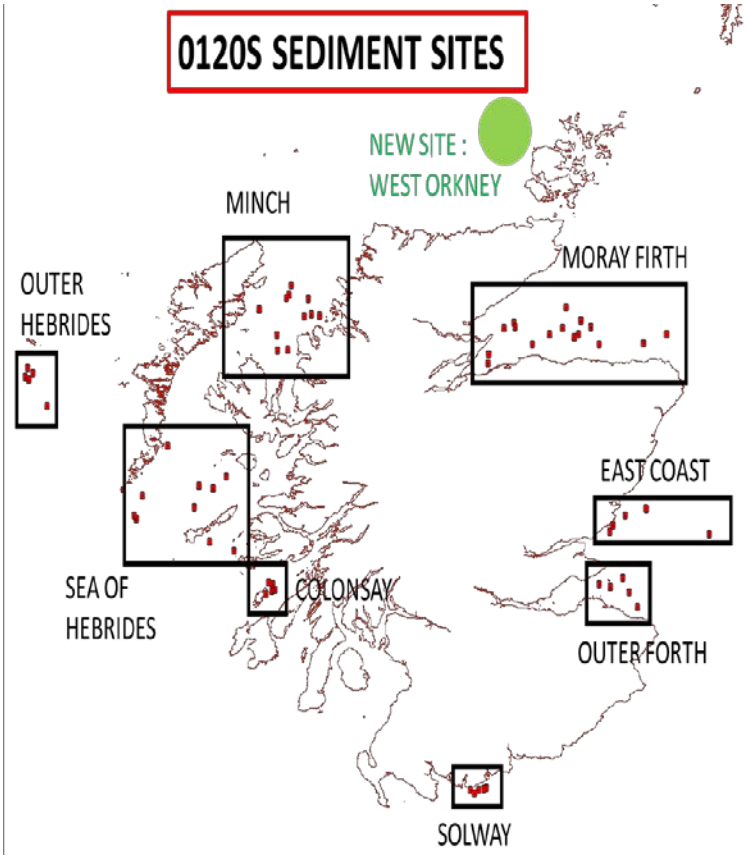
	Dab	Plaice
Total number of fish required	50	25
Size range of fish required	20 – 30 cm	20 – 30 cm
Disease	50	N/A
Blood	25	25
Gills (microplastics)	5	5
Bile	25	25
Liver (S9 fraction EROD)	15 MALES	15 MALES
Liver (histology)	50	N/A
Liver (metals) (~ 2g)	25 (5 pools)	25 (5 pools)
Liver (chemistry) (> 4g)	25 (5 pools)	25 (5 pools)
Liver (RGU)	10	NA
Gut (Microplastics)	25	25
Gonad (histology)	All MALES only	N/A
Otolith	50	N/A
White muscle*	25	N/A
Flesh (metals) (> 10g)	25 (5 pools)	25 (5 pools)
Flesh (chemistry) (> 30g)	25 (5 pools)	25 (5 pools)

Full sampling details in SOP 0820 and SOP 0830.

Sediment sampling will be carried out at the Montrose bank, East coast, Inner and Outer Moray Firth, Minch North, Minch South, Colonsay, Outer Hebrides, Sea of Hebrides and Solway sites. 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) (see Map 1). Sediments will be sampled for chemical analyses

at all locations. The coordinates of all sediments site is shown in Table 3 (Primary sites) and Table 4 (Secondary sites – used if Sampling a Primary site failed).

Sediment sampling will also be attempted in the West of Orkney (exact location to be confirmed - see green circle on (Map 1) to add another sampling site on the CSEMP programme.



Map 1: Sediment sites location.

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 (exact high priority locations to be confirmed) and samples processed onboard as far as possible. Additional sediment samples will also be taken for micro-plastics where possible. Fish guts and any other biota of interest might also be preserved and returned to the lab for analysis (exact sampling requirements to be confirmed)

The Aquatracka will be deployed in the Forth and in at least one other area to obtain reference measurements. Vertical profiling will be performed and tows using the modified acoustic sledge will also be tested.

The vessel will return to Aberdeen for unloading on 21 January 2020.

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

Normal contacts will be maintained with the laboratory.

Submitted:
G Hermann
06 December 2019

Approved:
I Gibb
06 December 2019

Table 3: Sediment grabs locations – PRIMARY SITES.

REGION	Field ID	decLat	decLong	Latitude	Longitude
Outer Forth	**E of Isle of May**	56.1994	-2.4096	56 11.96N	002 24.57W
	N of Wheat Stack	55.9998	-2.2497	55 59.99N	002 14.98W
	NE Torness	56.1001	-2.3404	56 6.00N	002 20.42W
	Rath Grounds	56.1593	-2.6593	56 9.56N	002 39.56W
	S of Isle of May	56.1335	-2.5351	56 8.01N	002 32.11W
The Minch North	**UM1.1**	58.0350	-6.2100	58 2.10N	006 12.60W
	UM1.2	58.1060	-5.6950	58 6.36N	005 41.70W
	UM1.3	57.9870	-5.7430	57 59.22N	005 44.58W
	UM1.4	58.2000	-5.8800	58 12.00N	005 52.80W
	UM1.5	57.9910	-5.5810	57 59.46N	005 34.86W
	85se	58.0000	-5.6667	58 0.00N	005 40.00W
The Minch South	**UM2.1**	58.1120	-5.9310	58 6.72N	005 55.86W
	UM2.2	58.1320	-5.8980	58 7.92N	005 53.88W
	UM2.3	57.8590	-6.0280	57 51.54N	006 1.68W
	UM2.4	57.7540	-6.0200	57 45.24N	006 1.20W
	UM2.5	57.7580	-5.9130	57 45.48N	005 54.78W
Sea of Hebrides	**SOH1.1**	56.7640	-7.4390	56 45.84N	007 26.34W
	SOH1.2	56.6000	-7.4990	56 36.00N	007 29.94W
	SOH1.3	56.8310	-6.8440	56 49.86N	006 50.64W
	SOH1.4	56.4460	-6.7310	56 26.76N	006 43.86W
	SOH1.5	56.6270	-7.5260	56 37.62N	007 31.56W
	SOH1.6	56.6850	-6.8890	56 41.10N	006 53.34W
	SOH1.7	57.1010	-7.1720	57 6.06N	007 10.32W
	SOH1.8	56.8930	-6.5550	56 53.58N	006 33.30W
	SOH1.9	56.3870	-6.4770	56 23.22N	006 28.62W
	SOH1.10	56.8100	-6.6940	56 48.60N	006 41.64W
Hebrides	**HEB1 1**	57.5560	-8.6250	57 33.36N	008 37.50W
	HEB1 2	57.6370	-8.6370	57 38.22N	008 38.22W
	HEB1 3	57.5770	-8.6640	57 34.62N	008 39.84W
	HEB1 4	57.3750	-8.4330	57 22.50N	008 25.98W
	HEB1 5	57.6000	-8.5810	57 36.00N	008 34.86W
Colonsay	**COL1**	56.1100	-6.0800	56 6.60N	006 4.80W
	COL2	56.0890	-6.1420	56 5.34N	006 8.52W

	COL3	56.1180	-6.0510	56 7.08N	006 3.06W
	COL4	56.1520	-6.0720	56 9.12N	006 4.32W
	COL5	56.1680	-6.1160	56 10.08N	006 6.96W
Solway	**SOL1**	54.7500	-4.0000	54 45.00N	003 60.00W
	SOL2	54.7665	-3.8345	54 45.99N	003 50.07W
	SOL3	54.7565	-3.8630	54 45.39N	003 51.78W
	SOL4	54.7500	-3.9157	54 45.00N	003 54.94W
	SOL5	54.7272	-3.9600	54 43.63N	003 57.60W
East Coast	**EC1.1**	56.5570	-2.5100	56 33.42N	002 30.60W
	EC1.2	56.6690	-2.1630	56 40.14N	002 9.78W
	EC1.3	56.6270	-2.3810	56 37.62N	002 22.86W
	EC1.4	56.5180	-2.5460	56 31.08N	002 32.76W
	EC1.5	56.6780	-2.1690	56 40.68N	002 10.14W
	165se	56.5000	-1.5000	56 30.00N	001 30.00W
Moray Firth	**MF1.1**	57.7320	-3.8110	57 43.92N	003 48.66W
	MF1.2	57.9040	-3.6480	57 54.24N	003 38.88W
	MF1.3	57.7990	-3.3580	57 47.94N	003 21.48W
	MF1.4	57.9440	-3.5460	57 56.64N	003 32.76W
	MF1.5	57.9120	-3.5300	57 54.72N	003 31.80W
	MF2.1	57.9600	-2.8450	57 57.60N	002 50.70W
	MF2.2	57.9150	-2.7380	57 54.90N	002 44.28W
	MF2.3	57.8670	-1.9490	57 52.02N	001 56.94W
	MF2.4	57.8690	-2.8690	57 52.14N	002 52.14W
	MF2.5	57.8040	-2.1900	57 48.24N	002 11.40W
	MF2.6	57.7990	-2.6530	57 47.94N	002 39.18W
	MF2.7	57.8610	-3.1720	57 51.66N	003 10.32W
	MF2.8	57.8440	-2.9130	57 50.64N	002 54.78W
	MF2.9	57.9050	-3.0410	57 54.30N	003 2.46W
	MF2.10	57.9050	-3.0410	57 54.30N	003 2.46W
	105se	58.0500	-3.0000	58 3.00N	002 60.00W
	95se	57.6667	-3.8167	57 40.00N	003 49.00W

Table 4: Sediment grabs locations – SECONDARY SITES

REGION	Field ID	decLat	decLong	Latitude	Longitude
The Minch North	**UM1.6**	58.1330	-5.6540	58 7.98N	005 39.24W
	UM1.7	58.3080	-6.0300	58 18.48N	006 1.80W
	UM1.8	58.1130	-6.1690	58 6.78N	006 10.14W
	UM1.9	58.2560	-5.5300	58 15.36N	005 31.80W
	UM1.10	58.2060	-5.4990	58 12.36N	005 29.94W
The Minch South	**UM2.6**	57.8770	-6.1830	57 52.62N	006 10.98W
	UM2.7	57.8420	-6.1730	57 50.52N	006 10.38W
	UM2.8	57.9390	-6.0410	57 56.34N	006 2.46W
	UM2.9	57.7180	-6.1330	57 43.08N	006 7.98W
	UM2.10	57.8310	-5.9900	57 49.86N	005 59.40W
Sea of Hebrides	**SOH1.11**	56.8430	-6.6550	56 50.58N	006 39.30W
	SOH1.12	56.7570	-7.1110	56 45.42N	007 6.66W
	SOH1.13	56.9120	-7.2950	56 54.72N	007 17.70W
	SOH1.14	56.7490	-6.9390	56 44.94N	006 56.34W
	SOH1.15	56.4480	-7.1510	56 26.88N	007 9.06W
Hebrides	**HEB1 6**	57.6050	-8.7390	57 36.30N	008 44.34W
	HEB1 7	57.6050	-8.6920	57 36.30N	008 41.52W
	HEB1 8	57.5150	-8.6540	57 30.90N	008 39.24W
	HEB1 9	57.4880	-8.6440	57 29.28N	008 38.64W
	HEB1 10	57.5790	-8.7550	57 34.74N	008 45.30W
East Coast	**EC1 6**	56.7190	-2.2080	56 43.14N	002 12.48W
	EC1 7	56.6350	-2.3540	56 38.10N	002 21.24W
	EC1 8	56.5450	-2.4050	56 32.70N	002 24.30W
	EC1 9	56.5540	-2.4220	56 33.24N	002 25.32W
	EC1 10	56.6490	-2.2520	56 38.94N	002 15.12W
Moray Firth	**MF1 6**	57.9010	-3.4510	57 54.06N	003 27.06W
	MF1 7	57.8740	-3.6280	57 52.44N	003 37.68W
	MF1 8	57.6440	-3.6640	57 38.64N	003 39.84W
	MF1 9	57.7200	-3.6250	57 43.20N	003 37.50W
	MF1 10	57.9200	-3.6600	57 55.20N	003 39.60W
	MF2 11	57.7750	-2.3650	57 46.50N	002 21.90W
	MF2 12	57.8420	-2.1150	57 50.52N	002 6.90W
	MF2 13	57.7980	-2.3940	57 47.88N	002 23.64W
	MF2 14	57.8280	-1.9120	57 49.68N	001 54.72W
	MF2 15	57.7940	-2.3640	57 47.64N	002 21.84W