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FV Lady Nicola UL 584

Survey: Drop-down video survey of seabed habitats and Priority Marine Features in Loch Alsh and Inner Sound

REPORT

16 - 20 July 2018

Loading: Kyle of Lochalsh, 16 July 2018 Boarding: Kyle of Lochalsh, 16 July 2018 Unloading: Kyle of Lochalsh, 20 July 2018

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	Organisation	Role
C Johnston	Crangon Ltd	SIC
G. Course	Seascope Fisheries Research	
G. Pasco	Seascope Fisheries Research	
L. Kamphausen	Scottish Natural Heritage	16 – 18 July
S. Henderson	Scottish Natural Heritage	18 – 20 July

Project: 5 days

Gear

DDV camera frame, umbilicals (300m + 100m), camera system, lights and control unit.

SNH camera sledge, GoPro[™] Hero 4 camera in housing, lights, 80m umbilical, surface control unit, GPS

Background and Objectives

This is a partnership project between Marine Scotland (MS) and Scottish Natural Heritage (SNH) and is funded through the European Maritime and Fisheries Fund (EMFF). This survey is one of several planned for 2018 and 2019 working in collaboration with fishermen to collect information on seabed habitats within and adjacent to Scottish Marine Protected Areas (MPAs). More information on the project can be found at: <u>https://www2.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAmonitoring/EMFFproject.</u>

The objectives for this survey were:

- To train staff in the use of the new drop-down video (DDV) system.
- To undertake a programme of targeted DDV sampling to enhance our understanding of the distribution and extent of flame shell beds and other sensitive benthic Priority Marine Features (PMFs) within and adjacent to the Lochs Duich, Long and Alsh MPA (survey areas shown as red and orange polygons in Figure 1).

The focus of the sampling was to carry out targeted surveys of PMFs and MPA protected features including flame shell beds, burrowed mud, maerl and Annex I reefs (including horse mussel reef). The footage will be used to confirm habitat presence, extent and current status of such features. The survey builds upon work in previous years to refine the habitat maps for the area.

Narrative

Scientists joined the vessel at Kyleakin on 16 July 2018.

The initial plan was to deploy and test a new DDV camera system, from the fishing vessel at or near to pre-identified coordinates within the survey polygons in Figure 1. The planned survey positions were manually entered into the vessel navigation system each day as bulk loading of positions was not possible. During operation, the camera frame was lowered over the side of the vessel using the winch/haul and positioned just above the seabed. A live feed of the standard definition (SD) video signal was provided to the surface control unit (SCU) located in the wheelhouse, and red-line lasers enabled the field of view to be judged. The live video feed to the wheelhouse was visible to the skipper and winch operator, to help with locating the camera above the seabed and orientating the vessel during tows.

The vessel was allowed to drift in the direction of the prevailing current or wind for approximately 5 minutes. Longer or shorter runs were appropriate in some situations depending on the local conditions and habitats encountered. Vessel speed in general was approximately 0.5kn during tows. 'Snapshot' still images of the seabed were taken at intervals to get a clearer image of the seabed type and flora/fauna. The SCU displayed live SD video with time/date stamp, GPS location (when operating) and

camera depth. LED lighting level was controlled from the SCU and was generally kept at maximum. High definition (HD) video and still photos were stored in the camera for later downloading. SD video with overlay was recorded directly on the SCU.

Sample location and other metadata were recorded on paper forms throughout the survey, with forms stored ashore at the end of each survey day and used to assist in quality control. Sample metadata are shown in Tables 1 and 2.

Weather conditions during the survey were excellent, with several days of flat calm seas, so the stations in the more weather-dependent and less accessible areas in Inner Sound were sampled first. Part of the purpose of this survey was to test the DDV camera system, and some problems were encountered on day 1 with the SCU (erratic positional data), and later with the functioning of both the camera, back up DDV camera system and the 100 m and 300 m umbilicals. The SNH back up camera system was therefore used after the first video drop on day 1 and for the rest of the survey (17 - 20 July) while the problems with the DDV camera systems were resolved with the supplier. This restricted sampling to seabed stations shallower than approximately 60-70 m. Each night at the staff accommodation video and stills files were downloaded from the camera, the camera memory cleared, batteries charged (for the SNH camera), and sampling details transcribed from paper forms into spreadsheets.

Seventy-six video samples (and 90 accompanying still images from the DDV camera system on day 1 only) were taken from all of the high priority areas, with the exception of the deep channel between Scalpay and the Crowlin Islands (inaccessible to the SNH camera system). Video samples were also collected from stations in lower priority areas in outer Kyleakin channel and the burrowed mud habitat in central Loch Alsh. Sampling locations are shown in Figures 2-5.

Submitted: Charlotte Johnston 26 November 2018

Approved: P Boulcott 03 February 2020



Figure 1 Location of sampling areas in Inner Sound and Loch Alsh July 2018



Figure 2. Drop down video stations surveyed in 2018 in Inner Sound and Loch Alsh, with initial planned stations in background.



Figure 3. Drop down video stations surveyed in 2018 in Inner Sound around Scalpay and the Crowlin Islands, with initially planned stations in background.



Figure 4. Drop down video stations surveyed in 2018 in Inner Sound off Applecross, with initially planned stations in background.



Figure 5. Drop down video stations surveyed in 2018 in outer Kyle Akin and Loch Alsh, with initially planned stations in background.

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MS EMFF Inner Sound 12 Scalpay DDV 16/07/2018 16:25:00 57 17.194 -6 2.235 16:31:00 57 17.228 -6 2.240 MS EMFF Inner Sound 13 Scalpay DDV 16/07/2018 16:25:00 57 17.118 -6 0.523 16:51:00 57 17.118 -6 0.501 MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.938 -5 48.512 MS EMFF Inner Sound		Loch Alsh and		Coalpay		10/01/2010	10.00.00		17.740	-0	2.100	10.12.00	07	17.751	-0	2.111
Loch Alsh and Inner Sound 13 Scalpay DDV 16/07/2018 16:46:00 57 17.118 -6 0.523 16:51:00 57 17.118 -6 0.501 MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 15 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.914 13:02:00 57 21.946 -5 48.512 Loch Alsh and 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 Loch Alsh and 16 Crowlins SNH	MS EMFF	Inner Sound	12	Scalpay	DDV	16/07/2018	16:25:00	57	17.194	-6	2.235	16:31:00	57	17.228	-6	2.240
MS EMFF Inner Sound 13 Scalpay DDV 16/07/2018 16:46:00 57 17.118 -6 0.523 16:51:00 57 17.118 -6 0.501 MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 15 Crowlins SNH 17/07/2018 12:38:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 Loch Alsh and MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 Loch Alsh and MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 Loch Alsh and MS E		Loch Alsh and														
Loch Alsh and Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Loch Alsh and Inner Sound 15 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 15 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.578 -5 48.512 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound <td>MS EMFF</td> <td>Inner Sound</td> <td>13</td> <td>Scalpay</td> <td>DDV</td> <td>16/07/2018</td> <td>16:46:00</td> <td>57</td> <td>17.118</td> <td>-6</td> <td>0.523</td> <td>16:51:00</td> <td>57</td> <td>17.118</td> <td>-6</td> <td>0.501</td>	MS EMFF	Inner Sound	13	Scalpay	DDV	16/07/2018	16:46:00	57	17.118	-6	0.523	16:51:00	57	17.118	-6	0.501
MS EMFF Inner Sound 14 Crowlins SNH 17/07/2018 12:38:00 57 20.713 -5 46.973 12:42:00 57 20.736 -5 46.961 MS EMFF Inner Sound 15 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 Loch Alsh and MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 Loch Alsh and MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.933 -5 48.916 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.933 -5 48.916 MS EMFF		Loch Alsh and														
Loch Alsh and Inner Sound 15 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5 49.515 13:48:00 57 21.933 -5 49.506 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5<	MS EMFF	Inner Sound	14	Crowlins	SNH	17/07/2018	12:38:00	57	20.713	-5	46.973	12:42:00	57	20.736	-5	46.961
MS EMFF Inner Sound 15 Crowlins SNH 17/07/2018 12:57:00 57 21.303 -5 48.148 13:02:00 57 21.338 -5 48.159 MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 Loch Alsh and Loch Alsh and Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5 49.515 13:48:00 57 21.933 -5 49.506 MS EMFF Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 <td< td=""><td></td><td>Loch Alsh and</td><td>45</td><td>Onesting</td><td>0.111</td><td>47/07/0040</td><td>40.57.00</td><td>67</td><td>04.000</td><td>_</td><td>40.440</td><td>40.00.00</td><td>F7</td><td>04.000</td><td>_</td><td>40.450</td></td<>		Loch Alsh and	45	Onesting	0.111	47/07/0040	40.57.00	67	04.000	_	40.440	40.00.00	F7	04.000	_	40.450
MS EMFF Inner Sound 16 Crowlins SNH 17/07/2018 13:14:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.909 -5 48.513 13:20:00 57 21.946 -5 48.512 MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5 49.515 13:48:00 57 21.933 -5 49.506 MS EMFF Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 MS EMFF Inner Sound			15	Crowlins	SINH	1//0//2018	12:57:00	57	21.303	-5	48.148	13:02:00	57	21.338	-5	48.159
INISELWIT Inner Sound 10 Crowlins SNT 17/07/2018 13:14:00 57 21:303 13:20:00 57 21:340 13:20:00 57 21:340 13:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:540 15:20:00 57 21:895 -5 49:515 13:48:00 57 21:93:3 -5 49:506 MS EMFF Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22:544 -5 49:821 <td< td=""><td></td><td>Loch Aish and</td><td>16</td><td>Crowline</td><td>SNH</td><td>17/07/2018</td><td>13.14.00</td><td>57</td><td>21 000</td><td>5</td><td>18 513</td><td>13.20.00</td><td>57</td><td>21 0/6</td><td>5</td><td>18 512</td></td<>		Loch Aish and	16	Crowline	SNH	17/07/2018	13.14.00	57	21 000	5	18 513	13.20.00	57	21 0/6	5	18 512
MS EMFF Inner Sound 17 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:29:00 57 21.540 -5 48.904 13:34:00 57 21.578 -5 48.916 MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5 49.515 13:48:00 57 21.933 -5 49.506 MS EMFF Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 MS EMFF Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 Loch Alsh and Inner Sound I9 Crowlins SNH I7/07/2018 I3:59:00 57 22.544 <td></td> <td>I och Alsh and</td> <td>10</td> <td>CIOWIIIIS</td> <td>SINT</td> <td>11/01/2010</td> <td>13.14.00</td> <td>57</td> <td>21.303</td> <td>-5</td> <td>40.010</td> <td>13.20.00</td> <td>57</td> <td>21.940</td> <td>-5</td> <td>40.512</td>		I och Alsh and	10	CIOWIIIIS	SINT	11/01/2010	13.14.00	57	21.303	-5	40.010	13.20.00	57	21.940	-5	40.512
Instruction	MS EMFF	Inner Sound	17	Crowlins	SNH	17/07/2018	13:29:00	57	21,540	-5	48,904	13:34:00	57	21.578	-5	48,916
MS EMFF Inner Sound 18 Crowlins SNH 17/07/2018 13:43:00 57 21.895 -5 49.515 13:48:00 57 21.933 -5 49.506 MS EMFF Loch Alsh and Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 Loch Alsh and Loch Alsh and Loch Alsh and		Loch Alsh and	1					Ţ.								
MS EMFF Loch Alsh and Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 Loch Alsh and Loch Alsh and Loch Alsh and <td< td=""><td>MS EMFF</td><td>Inner Sound</td><td>18</td><td>Crowlins</td><td>SNH</td><td>17/07/2018</td><td>13:43:00</td><td>57</td><td>21.895</td><td>-5</td><td>49.515</td><td>13:48:00</td><td>57</td><td>21.933</td><td>-5</td><td>49.506</td></td<>	MS EMFF	Inner Sound	18	Crowlins	SNH	17/07/2018	13:43:00	57	21.895	-5	49.515	13:48:00	57	21.933	-5	49.506
Locn Alsn and MS EMFF Locn Alsn and Inner Sound 19 Crowlins SNH 17/07/2018 13:59:00 57 22.544 -5 49.821 14:04:00 57 22.606 -5 49.816 Loch Alsh and																
INISENTE Inner Sound 19 Crowlins SINH 17/07/2018 13:59:00 57 22:544 -5 49:821 14:04:00 57 22:606 -5 49:816 Loch Alsh and		Loch Alsh and	10	Crowline	CNUL	17/07/2010	12.50.00	57	22 544	-	40.004	14.04.00	57	22.600		40.010
			19	Crowlins		17/07/2018	13:59:00	57	22.544	-5	49.821	14:04:00	57	22.000	-5	49.010
IMS EMEE Inner Sound 20 Crowlins SNH 17/07/2018 14/13/00 57 22/839 -5 50/264 14/18/00 57 22/842 -5 50/262	MS EMEE	Inner Sound	20	Crowlins	SNH	17/07/2018	14.13.00	57	22 839	-5	50 264	14.18.00	57	22 842	-5	50 262

Table 1 Loch Alsh and Inner Sound sampling station locations, July 2018

Project	Survey area	Station	Site name	Gear code	Date	Start	Start	Start	Start	Start	End time	End	End Lat	End	End
code	name	ref			sampled	time	Lat	Lat	Long	Long	(UTC)	Lat	mins	Long	Long
						(UTC)	Deg	mins	Deg	mins		Deg		Deg	mins
	Loch Alsh and	04	Onevuline	CNUL	47/07/0040	14.00.00	F7	00 540	-	50.070	44.25.00	F7	00 500	-	50.000
MS EMFF	Inner Sound	Z1	Crowins	SINH	17/07/2018	14:29:00	57	23.513	-5	50.278	14:35:00	57	23.522	-5	50.260
	Loch Alsh and	22	Crowline	CNUL	17/07/2010	14.51.00	57	00.674	-	50 707	14.56.00	57	00 740	F	F0 600
		22	Crowins		1//0//2018	14:51:00	57	23.071	-5	50.707	14:56:00	57	23.713	-5	000.000
	Loch Alsh and		Crowline	CNUL	17/07/2010	15.12.00	57	22 545	-	E1 111	15.19.00	57	22 500	F	E1 101
		23	Crowins		1//0//2018	15:13:00	57	22.040	-5	DI.144	15:16:00	57	22.596	-5	51.101
	Loch Alsh and	24	Crowling		17/07/2019	15.20.00	57	21 014	5	51 5 <i>1</i> 1	15.26.00	57	21.026	5	F1 F01
		24	Crowins		17/07/2016	15.30.00	57	21.914	-5	51.544	15.50.00	57	21.930	-5	51.501
	Inner Sound	25	Crowline	SNH	17/07/2018	15.51.00	57	21 107	5	50 420	15.56.00	57	21 225	5	50 /01
		25	CIOWIIIS	SINT	17/07/2010	13.31.00	57	21.197	-5	30.420	13.30.00	51	21.225	-5	30.401
	Loch Alsh and														
MS EMFF	Inner Sound	26	Crowlins	SNH	17/07/2018	16:08:00	57	20.833	-5	49.491	16:13:00	57	20.864	-5	49.508
	Loch Alsh and														
MS EMFF	Inner Sound	27	Crowlins	SNH	18/07/2018	08:31:00	57	20.294	-5	49.032	08:37:00	57	20.307	-5	49.029
	Loch Alsh and														
MS EMFF	Inner Sound	28	Crowlins	SNH	18/07/2018	08:55:00	57	19.998	-5	50.723	09:00:00	57	20.013	-5	50.750
	Loch Alsh and														
MS EMFF	Inner Sound	29	Crowlins	SNH	18/07/2018	09:13:00	57	20.750	-5	51.242	09:18:00	57	20.747	-5	51.254
	Loch Alsh and														
MS EMFF	Inner Sound	30	Crowlins	SNH	18/07/2018	09:32:00	57	21.433	-5	51.585	09:38:00	57	21.439	-5	51.593
	Loch Alsh and														
MS EMFF	Inner Sound	31	Applecross	SNH	18/07/2018	10:09:00	57	24.367	-5	50.388	10:15:00	57	24.369	-5	50.373
	Loch Alsh and														
MS EMFF	Inner Sound	32	Applecross	SNH	18/07/2018	10:31:00	57	25.274	-5	49.727	10:36:00	57	25.273	-5	49.767
	Loch Alsh and														
MS EMFF	Inner Sound	33	Applecross	SNH	18/07/2018	10:52:00	57	26.334	-5	50.622	10:57:00	57	26.310	-5	50.638
	Loch Alsh and														
MS EMFF	Inner Sound	34	Applecross	SNH	18/07/2018	11:07:00	57	26.456	-5	51.292	11:12:00	57	26.475	-5	51.317
	Loch Alsh and														
MS EMFF	Inner Sound	35	Applecross	SNH	18/07/2018	11:26:00	57	27.162	-5	51.956	11:31:00	57	27.190	-5	51.962
	Loch Alsh and								_					_	
MS EMFF	Inner Sound	36	Applecross	SNH	18/07/2018	11:40:00	57	27.482	-5	52.451	11:45:00	57	27.519	-5	52.468
	Loch Alsh and								_					_	
MS EMFF	Inner Sound	37	Applecross	SNH	18/07/2018	11:53:00	57	27.811	-5	52.350	11:58:00	57	27.852	-5	52.347
	Loch Alsh and					40.00.00			_		10.07.00		~~ ~~~	-	
MS EMFF	Inner Sound	38	Applecross	SNH	18/07/2018	12:22:00	57	29.936	-5	53.507	12:27:00	57	29.998	-5	53.496
	Loch Alsh and		A mm 4	ONILI	40/07/0040	40.07.00		20,400	-	50 400	10.10.00		20 504	_	F0 000
	Inner Sound	39	Appiecross	SNH	18/07/2018	12:37:00	5/	30.462	-5	53.100	12:42:00	57	30.524	-5	53.099
	Loch Aish and	40	Applearess	CNILL	10/07/2010	10.55.00	57	24 405		50.050	12.00.00	57	24 000	r	E0 250
		40	Appiecross	SINH	18/07/2018	12:55:00	57	31.185	-5	52.358	13:00:00	57	31.228	-5	52.358
	LOCH AISH and	14	Appleares	SNILL	10/07/2010	12.00.00	E7	21 460	-	E2 004	12.12.00	E7	21 407	F	E2 077
		41	Applecross		10/07/2018	13:08:00	5/	31.400		JZ.091	13:13:00	57	31.497	-5	52.UTT
	LOCH AISH and	40	Appleareas	SNILL	19/07/2019	12.24.00	E7	20.256	_	52 440	12.10.00	E7	30 336	E	52 11C
		42	Applecioss		10/07/2018	13.34.00	57	30.230	с-	55.410	13.40.00	57	30.330	-5	55.410

Project	Survey area	Station	Site name	Gear code	Date	Start	Start	Start	Start	Start	End time	End	End Lat	End	End
code	name	ref			sampled	time	Lat	Lat	Long	Long	(UTC)	Lat	mins	Long	Long
						(010)	Deg	111115	Deg	111115		Deg		Deg	111115
	Loch Alsh and														
MS EMFF	Inner Sound	43	E Scalpay	SNH	18/07/2018	15:11:00	57	20.353	-5	56.255	15:16:00	57	20.367	-5	56.238
	Loch Alsh and				10/07/00/00			10 505	_		45.00.00		40 500	_	
MS EMFF	Inner Sound	44	E Scalpay	SNH	18/07/2018	15:34:00	57	19.585	-5	58.532	15:39:00	57	19.599	-5	58.551
MS EMFF	Inner Sound	45	E Scalpay	SNH	18/07/2018	15:53:00	57	19.622	-5	56.694	15:58:00	57	19.614	-5	56.669
MS EMFF	Loch Alsh and Inner Sound	46	Kyleakin	SNH	19/07/2018	07:44:00	57	16.551	-5	44.977	07:46:00	57	16.565	-5	45.070
	Loch Alsh and								_					_	
MS EMFF	Inner Sound	47	Kyleakin	SNH	19/07/2018	07:55:00	57	16.657	-5	45.522	07:57:00	57	16.679	-5	45.573
MS EMFF	Loch Alsh and Inner Sound	48	E Scalpay	SNH	19/07/2018	08:49:00	57	19.355	-5	53.910	08:54:00	57	19.399	-5	53.879
MS EMEE	Loch Alsh and	49	F Scalpay	SNH	19/07/2018	09.13.00	57	18 574	-5	54 214	09.18.00	57	18 611	-5	54 203
	Loch Alsh and				10/01/2010	00.10.00	01	10.074	Ū	01.211	00.10.00	01	10.011	Ŭ	01.200
MS EMFF	Inner Sound	50	Kyleakin	SNH	19/07/2018	10:10:00	57	17.056	-5	45.616	10:15:00	57	17.098	-5	45.573
	Loch Alsh and														
MS EMFF	Inner Sound	51	Kyleakin	SNH	19/07/2018	10:24:00	57	16.961	-5	45.598	10:29:00	57	17.010	-5	45.548
	Loch Alsh and														
MS EMFF	Inner Sound	52	Kyleakin	SNH	19/07/2018	10:42:00	57	16.936	-5	45.549	10:47:00	57	16.987	-5	45.506
	Loch Alsh and	50		0.00	40/07/0040	40.50.00	F7	40.040	-	45 700	40.50.00	F7	40.007	-	45 700
MS EMFF	Inner Sound	53	кујеакіп	SNH	19/07/2018	10:53:00	57	16.842	-5	45.729	10:58:00	57	16.897	-5	45.722
MS EMEE	Loch Aish and	54	Kyleakin	SNH	10/07/2018	11.08.00	57	16 023	-5	15 783	11.13.00	57	16 087	-5	15 758
	Loch Alsh and		Туюакін	ONT	13/01/2010	11.00.00	57	10.325	-5	+0.700	11.15.00	57	10.307	-5	40.700
MS EMFF	Inner Sound	55	E Scalpay	SNH	19/07/2018	12:08:00	57	17.727	-5	52,526	12:13:00	57	17.758	-5	52,513
	Loch Alsh and														
MS EMFF	Inner Sound	56	E Scalpay	SNH	19/07/2018	12:56:00	57	19.724	-5	59.373	13:01:00	57	19.758	-5	59.319
	Loch Alsh and														
MS EMFF	Inner Sound	57	E Scalpay	SNH	19/07/2018	13:19:00	57	19.831	-5	56.734	13:23:00	57	19.870	-5	56.732
	Loch Alsh and	50	FO 1	0.00	40/07/0040	40.44.00		40.450	_	50.000	10.10.00		40.000	_	50.040
MS EMFF	Inner Sound	58	E Scalpay	SNH	19/07/2018	13:41:00	57	19.158	-5	56.203	13:46:00	57	19.226	-5	56.216
	LOCH AISH and	50	E Scalpay	SNH	10/07/2018	13.50.00	57	10 368	5	54 068	14.04.00	57	10 / 25	5	54 054
	Loch Alsh and			ONT	13/01/2010	10.00.00	57	13.000	-5	34.300	14.04.00	57	13.425	-0	04.004
MS EMFF	Inner Sound	60	E Scalpav	SNH	19/07/2018	14:34:00	57	17.650	-5	55.096	14:39:00	57	17.695	-5	55.076
	Loch Alsh and														
MS EMFF	Inner Sound	61	E Scalpay	SNH	19/07/2018	15:05:00	57	16.279	-5	56.750	15:08:00	57	16.311	-5	56.707
	Loch Alsh and														
MS EMFF	Inner Sound	62	E Scalpay	SNH	19/07/2018	15:19:00	57	16.508	-5	56.119	15:24:00	57	16.582	-5	56.059
	Loch Alsh and		E Carlore		40/07/0040	45.04.00		40 700	-		45.07.00		40.040	-	FF 400
		63	E Scalpay	SINH	19/07/2018	15:31:00	57	10.782	-5	55.245	15:37:00	57	10.843	-5	55.182
MS EMEE	Inner Sound	64	F Scalpay	SNH	19/07/2018	15:46:00	57	16 571	-5	55 574	15.52.00	57	16 635	-5	55 525
		0+			10/01/2010	10.40.00	51	10.071	-J	00.074	10.02.00	51	10.000	-J	00.020

Project code	Survey area name	Station ref	Site name	Gear code	Date sampled	Start time (UTC)	Start Lat Deg	Start Lat mins	Start Long Deg	Start Long mins	End time (UTC)	End Lat Deg	End Lat mins	End Long Deg	End Long mins
MS EMFF	Loch Alsh and Inner Sound	65	E Scalpay	SNH	19/07/2018	16:09:00	57	17.027	-5	52.597	16:16:00	57	17.112	-5	52.561
MS EMFF	Loch Alsh and Inner Sound	66	Kyleakin	SNH	20/07/2018	10:52:00	57	16.926	-5	45.823	10:55:00	57	16.968	-5	45.861
MS EMEE	Loch Alsh and	67	Kyleakin	SNH	20/07/2018	11:05:00	57	16 813	-5	45 505	11.36.00	57	16 982	-5	45 526
MS EMEE	Loch Alsh and	68	Kyleakin	SNH	20/07/2018	12:06:00	57	16 851	-5	45 424	12:23:00	57	16 927	-5	45 410
MS EMFF	Loch Alsh and Inner Sound	69	Kyleakin	SNH	20/07/2018	12:32:00	57	16.914	-5	45.122	12:37:00	57	16.927	-5	45.089
MS EMFF	Loch Alsh and Inner Sound	70	Kyleakin	SNH	20/07/2018	12:48:00	57	16.930	-5	45.216	12:57:00	57	16.934	-5	45.139
MS EMFF	Loch Alsh and Inner Sound	71	Kyleakin	SNH	20/07/2018	13:08:00	57	16.825	-5	45.130	13:09:00	57	16.825	-5	45.099
MS EMFF	Loch Alsh and Inner Sound	72	Kyleakin	SNH	20/07/2018	13:21:00	57	16.708	-5	45.191	13:30:00	57	16.678	-5	45.093
MS EMFF	Loch Alsh and Inner Sound	73	Loch Alsh	SNH	20/07/2018	14:29:00	57	16.534	-5	39.746	14:34:00	57	16.543	-5	39.694
MS EMFF	Loch Alsh and Inner Sound	74	Loch Alsh	SNH	20/07/2018	14:52:00	57	16.780	-5	38.896	14:58:00	57	16.794	-5	38.842
MS EMFF	Loch Alsh and Inner Sound	75	Loch Alsh	SNH	20/07/2018	15:32:00	57	16.428	-5	40.282	15:37:00	57	16.442	-5	40.234
MS EMFF	Loch Alsh and Inner Sound	76	Loch Alsh	SNH	20/07/2018	15:56:00	57	16.445	-5	41.052	16:04:00	57	16.444	-5	40.936

Table 2 Loch Alsh and Inner Sound sampling station descriptions, July 2018

Station ref	Site name	Date sampled	Start depth (m BCD)	End depth (m BCD)	Vessel speed Kn	Video drop duration	Video quality	Seabed physical type	Notes on fauna & flora
1	Scalpay	16/07/2018	52.50	51.60	0.5	00:05	Good	Muddy sand and boulders	Few echinoderms, squat lobsters.
2	Scalpay	16/07/2018	38.40	50.50	0.5	00:11	Good	Muddy sand, cobbles & boulders	Starfish (Luidia sp), kelp debris
3	Scalpay	16/07/2018	42.50	47.50	0.5	00:06	Good	Fine sand & pebbles, boulders towards end	Kelp debris
4	Scalpay	16/07/2018	17.10	16.70	0.5	00:07	Good	Shelly sand with cobbles	Few echinoderms
5	Scalpay	16/07/2018	22.80	37.80	0.5	00:05	Good	Sand with pebbles, cobbles & few boulders	
6	Scalpay	16/07/2018	11.80	10.40	0.5	00:06	Good	Pebbly sand	Kelp (Sacc. latissima)
7	Scalpay	16/07/2018	8.55	7.80	0.5	00:03	Good	Pebbly sand	Kelp (Sacc. latissima)

Station ref	Site name	Date sampled	Start depth (m BCD)	End depth (m BCD)	Vessel speed Kn	Video drop duration	Video quality	Seabed physical type	Notes on fauna & flora
8	Scalpay	16/07/2018	27.80	25.30	0.5	00:05	Good	Shelly sand, cobbles @ 4min	Echinus, Luidia, Pecten
9	Scalpay	16/07/2018	20.30	31.30	0.5	00:11	Good	Gravelly muddy sand to sand and boulders, back to muddy sand	Kelp debris in deeper water, kelps on boulders in shallow
10	Scalpay	16/07/2018	28.20	34.20	0.5	00:11	Good	Gravelly muddy sand to sand and boulders, back to muddy sand	Echinoderms
11	Scalpay	16/07/2018	21.20	22.20	0.5	00:07	Good	Gravelly sand, boulders & cobbles	
12	Scalpay	16/07/2018	5.20	5.20	0.5	00:06	Good	Muddy sand	Saccarina latissima, lots of brittlestars on kelp, maerl beneath
13	Scalpay	16/07/2018	5.80	6.80	0.5	00:05	Good	Muddy shelly sand	Algal 'fluff'!
14	Crowlins	17/07/2018	25.80	19.80	0.5	00:04	Good	Shelly muddy sand	Algal debris, Luidia, squat lobsters, coralline algae on stones
15	Crowlins	17/07/2018	24.70	24.70	0.5	00:05	Good	Cobbles on coarse sand	Corallines on cobbles
16	Crowlins	17/07/2018	20.70	18.70	0.5	00:06	Good	Muddy sand, pebbles and shells	Echinus, coralline algae, algal debris
17	Crowlins	17/07/2018	15.70	13.70	0.5	00:05	Good	Cobbles & fine sand	Hydroids, Virgularia mirabilis, Echinus Luidia, feather stars
18	Crowlins	17/07/2018	16.70	18.70	0.5	00:05	Good	Shelly sand, cobbles @ 3-4min	Swarm' of queen scallops, corallines, algal debris
19	Crowlins	17/07/2018	12.80	16.80	0.5	00:05	Good	Cobbles and large boulders, then fine sand with pebbles & shells	Kelp, algal 'fluff', corallines, hydroids, abundant queenies on kelp
20	Crowlins	17/07/2018	26.80	25.80		00:05	Good	Steep slope of silty rock, boulders, then sand	Corallines, squat lobsters, hydroids
21	Crowlins	17/07/2018	17.80	16.80	0.5	00:06	Good	Shelly sand, pebbles, maerl	Kelps, red algae, few queenies, patch maerl, Marthasterias
22	Crowlins	17/07/2018	24.80	23.80	0.5	00:05	Good	Pebbly shelly sand, large boulder	Featherstars, abundant sea squirts, corallines, green & red algae, squat lobsters
23	Crowlins	17/07/2018	18.80	22.80	0.5	00:05	Good	Dense maerl bed on rise, rock & boulders in deeper water	Maerl, hydroids, featherstars, red algae, ?Swiftia/hydroid, corallines on boulders
24	Crowlins	17/07/2018	20.80	19.80	0.5	00:06	Good	Cobbles, boulders & shell gravel	Algal 'fluff', ?maerl patches, hydroids, corallines on boulders. ?Possible empty Limaria shells
25	Crowlins	17/07/2018	33.10	34.10		00:05	Good	Muddy shelly sand	Lots of squatties, mud mounds, queenies, echinus - anecdotally previously dredged
26	Crowlins	17/07/2018	22.80	22.80	0.5	00:05	Good	Shelly gravel, cobbles & pebbles	Red & green algae, corallines, squatties, hydroids, featherstars, Luidia, Pecten & empty shells, seasquirts
27	Crowlins	18/07/2018	21.80	22.80	0.1	00:06	Good	Shelly sand with few cobbles	Coralline algae, hydroids, squatties, Virgularia
28	Crowlins	18/07/2018	20.00	19.00	0.1	00:05	Good	Shelly gravel and pebbles with maerl patches	Sparse red algae, queenies, Luidia, coralline alage on stones
29	Crowlins	18/07/2018	23.00	24.00	0.1	00:05	Good	Gravel, pebbles & cobbles with sand between	Corallines, red & green/brown algae, queenies (few) sea squirts

Station ref	Site name	Date sampled	Start depth (m BCD)	End depth (m BCD)	Vessel speed Kn	Video drop duration	Video quality	Seabed physical type	Notes on fauna & flora
30	Crowlins	18/07/2018	19.50	19.50	0.1	00:06	Good	Maerl, shell gravel, pebbles, some rock	Coralline algae, reds and green/brown algae, featherstars
31	Applecross	18/07/2018	34.50	35.50	0.1	00:06	Good	Coarse shelly sand, silt & boulders	Coralline algae, ?Leptometra, hydroids, ball sea squirt
32	Applecross	18/07/2018	26.50	27.50	0.1	00:05	Good	Shelly sand, cobbles & pebbles	Corallines, urchin
33	Applecross	18/07/2018	20.30	30.30	0.1	00:05	Good	Shell gravel	Corallines, squatties, Echinus, few fauna
34	Applecross	18/07/2018	23.30	21.30	0.5	00:05	Good	Shelly gravel, pebbles	Corallines,Cerianthus, squat lobsters, ball sea squirt
35	Applecross	18/07/2018	15.30	11.30	0.4	00:05	Good	Sandy gravel, shells	Red & green algae, corallines, squat lobsters
36	Applecross	18/07/2018	18.30	22.30	0.4	00:05	Good	Maerl	Queenies, red & green algae, sea pen, Cerianthus, Cancer
37	Applecross	18/07/2018	15.50	16.50	0.6	00:05	Good	Shelly gravel, maerl	Modiolus, squat lobster, coralline algae, red & green algae, Cancer
38	Applecross	18/07/2018	23.50	23.50	0.8	00:05	Good	Maerl, cobbles, pebbles	Coralline, Luidia, sea cucumber, featherstars
39	Applecross	18/07/2018	24.50	25.50	0.8	00:05	Good	Maerl	Dense maerl bed, feather stars
40	Applecross	18/07/2018	20.00	24.00	0.5	00:05	Good	Maerl	Maerl bed, Luidia, ?flame shell nests, cushion star
41	Applecross	18/07/2018	25.00	22.00	0.4	00:05	Good	Maerl	Maerl, queenies, Cancer
42	Applecross	18/07/2018	23.90	25.90	0.8	00:06	Good	Maerl, few pebbles	Dense maerl, echinoderms, cushion stars, sea squirts
43	E Scalpay	18/07/2018	23.90	23.90	0.2	00:05	Good	Maerl, plus bedrock at end	Maerl, cushion star, sea squirt, squat lobster, feather star, queenies, urchin
44	E Scalpay	18/07/2018	19.90	20.90	0.2	00:05	Good	Maerl, shells	Maerl, fluffy seaweed, hermit crab
45	E Scalpay	18/07/2018	17.30	16.30	0.2	00:05	Good	Maerl	Maerl bed, brown algae (sugar kelp)
46	Kyleakin	19/07/2018	12.80	11.30	1.1	00:02	Poor	Rock?	Kelps, red algae, tide too fast to see properly
47	Kyleakin	19/07/2018	8.40	7.60	1.1	00:02	Poor	Rock?	Kelps, red algae, tide too fast to see properly
48	E Scalpay	19/07/2018	25.50	32.60	0.5	00:05	Mod (too fast)	Cobbles, boulders & shelly sand	Squatties, seasquirts, echinoderms
49	E Scalpay	19/07/2018	36.10	27.10	0.5	00:05	Mod (too fast)	Sandy mud, cobbles, burrows, broken shells	Squatties, Turritella, squirts, scallops
50	Kyleakin	19/07/2018	31.10	24.80	0.5	00:05	Mod (too fast)	Shelly sand, cobbles, boulders, sand (?rope)	Kelp, hydroids, featherstars
51	Kyleakin	19/07/2018	15.20	25.70	0.7	00:05	Mod (too fast)	Cobbly	Algal turf, occasional kelp, hydroids, possible flame shell nests at start
52	Kyleakin	19/07/2018	14.20	18.40	0.8	00:05	Mod (too fast)	Cobbly boulders & shelly sand	Kelp & red algal turf, possible flame shell bed
53	Kyleakin	19/07/2018	8.90	11.30	0.9	00:05	Mod (too fast)	Cobbles, boulders, sandy shells	Dense kelp, possible flame shell bed
54	Kyleakin	19/07/2018	10.90	31.40	0.6	00:05	Mod (too fast)	Boulders, cobbles, shelly sand	Kelp, red algal turf, hydroids

Station ref	Site name	Date sampled	Start depth (m BCD)	End depth (m BCD)	Vessel speed Kn	Video drop duration	Video quality	Seabed physical type	Notes on fauna & flora
							Mod (too	Fine muddy sand with burrows	
55	E Scalpay	19/07/2018	41.10	42.40	0.7	00:05	fast)	and boulders	Squat lobsters, ?Thornback ray
56	E Scalpay	19/07/2018	17.80	23.50	0.5	00:05	Mod (too fast)	Shelly gravel, cobbles, razor shells	Hydroids, Virgularia mirabilis, brittlestars
57	E Scalpay	19/07/2018	13.00	10.50	0.6	00:04	Mod (too fast)	Boulders, shelly sand	Kelp, red algal turf, urchins, featherstars
58	E Scalpay	19/07/2018	15.60	22.60	0.9	00:05	Mod (too fast)	Bedrock with sandy patches	Kelp, featherstars, hydroids, red algae, urchins
59	E Scalpav	19/07/2018	21.60	16.20	0.6	00:05	Mod (too fast)	Boulders, cobbles, sandy patches, then cliff bedrock	Kelp, not much turf, starfish, urchins, hydroids, featherstars
60	E Scalpay	19/07/2018	30.90	29.30	0.8	00:05	Mod (too fast)	Cobbles mud bedrock	Squatties, Virgularia, scallop, squirts, Turritella - 2dredged
		10/01/2010	00.00	20.00	0.0	00.00	Mod (too		. alougou
61	E Scalpay	19/07/2018	31.60	21.40	0.5	00:03	fast)	Burrowed mud	Squatties - dredged?
62	E Scalpay	19/07/2018	20.70	17.90		00:05	fast)	boulders	Burrows, squatties - dredged?
63	E Scalpay	19/07/2018	20.50	23.20	0.9	00:06	Mod (too fast)	Boulder, cobbles, sandy shelly patches	Red algae, hydroids, close to prev. flame shell record
0.4		40/07/0040	40.40	40.00		00.00	Mod (too	Cobbles, sandy,	Our mission and almost halo that for the materia
64	E Scalpay	19/07/2018	19.40	10.80	0.8	00:06	Mod (too	boulders/bedrock	Queenies, red algae, keip, turr, reatherstars
65	E Scalpay	19/07/2018	27.90	29.20	0.7	00:07	fast)	Muddy fine sand, shells, burrows	Nephrops, - ?dredged
66	Kyleakin	20/07/2018	12.00	42.30	1	00:03	Good	Steep slope of cobbles, muddy sand	Kelp
67	Kyleakin	20/07/2018	11.00	17.70	0.4	00:31	Good	Cobbles, shelly sand patches	Kelp, red algal turf ?flame shell bed
68	Kyleakin	20/07/2018	9.90	14.90	0.3	00:17	Good	Cobbles, shelly sand	Kelps, corallines
69	Kyleakin	20/07/2018	20.80	22.50	0.3	00:05	Good	Cobbles, shells	Red algae, mussel, queenies, squatties, featherstars
70	Kyleakin	20/07/2018	15.70	20.70	0	00:09	Good	Cobbles, shelly sand	Kelp, Oyster, queenies, hydroids, scallop shells, featherstars, octopus
71	Kyleakin	20/07/2018	15.00	15.40	0	00:01	Good	Cobbles, shelly sand	Kelp, brittlestars, queenies, red algae
72	Kyleakin	20/07/2018	11.60	10.30	0	00:09	Good	Cobbles, shelly sand	Kelp, flame shell bed >70%
73	Loch Alsh	20/07/2018	65.80	65.00	0	00:05	Good	Burrowed mud	Funiculina, virgularia, Pennatula
74	Loch Alsh	20/07/2018	52.30	51.30	0.4	00:06	Good	Burrowed mud	Kelp debris, nephrops
75	Loch Alsh	20/07/2018	56.00	65.00	0	00:05	Good	Silty bedrock then burrowed mud	Pennatula, Funiculina, Virgularia, squatties/nephrops
76	Loch Alsh	20/07/2018	68.30	58.90	0.4	00:08	Good	Mud, shells, burrows	Squatties, Nephrops burrows, orange tentacled cucumber, Leptometra, hydroids