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FV Lady Nicola UL 584

Survey: Drop-down video survey of seabed habitats and Priority Marine Features in Wester Ross

REPORT

30 July - 04 August 2018

Loading: Ullapool, 30 July 2018

Boarding: Ullapool, 30 July 2018 and Aultbeag 02 August

Unloading: Ullapool, 04 August 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
G. Course	Seascope Fisheries Research	SIC
G. Pasco	Seascope Fisheries Research	
K Dearing	Scottish Natural Heritage	30 July - 01 August
M. Fenton	Scottish Natural Heritage	02 August
J. Dargie	Scottish Natural Heritage	03 August

Project: 5 days

Gear

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

SNH camera sledge (backup – not used), 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: <https://www2.gov.scot/Topics/marine/marine-environment/mpanetwork/MPAmonitoring/EMFFproject>.

The objectives for this survey were:

- To undertake a programme of targeted drop-down video (DDV) sampling to enhance our understanding of the distribution and extent of maerl beds, northern feather star aggregations and other benthic habitats within and adjacent to the Wester Ross MPA (planned survey areas shown as polygons in Figure 1).

The focus of the sampling was to carry out targeted surveys of seabed habitats. 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 Ullapool from 30 July and the SNH staff changed on Day 4, at Aultbeag.

The plan was to use the 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. Video files were downloaded from the camera at the end of each survey day, and data backed up according to the agreed protocols. Data from days 1 and 2 weren't downloaded until day 3 due to problems with the camera

Westerly and south westerly winds force 4-5 dominated at the start of the week, reducing to SW 3-4 later in the week and slight to moderate swell in exposed areas. Therefore, survey was focussed on stations on the eastern sides of land masses and islands where there was more shelter from wind and swell. Figure 2 shows all the video tow locations and Figures 3-6 show detailed locations of DDV stations sampled.

One hundred and thirty video samples and 1280 accompanying still images were collected from all the higher priority sampling locations. There was insufficient time to collect samples from the gap-filling areas (blue polygons in Figure 1) outside the Wester Ross MPA, and poor weather prevented sampling at a few of the planned locations more exposed to the west (e.g. polygon MR9).

Submitted: Charlotte Johnston 26 November 2018

Approved: P Boulcott 03 February 2020

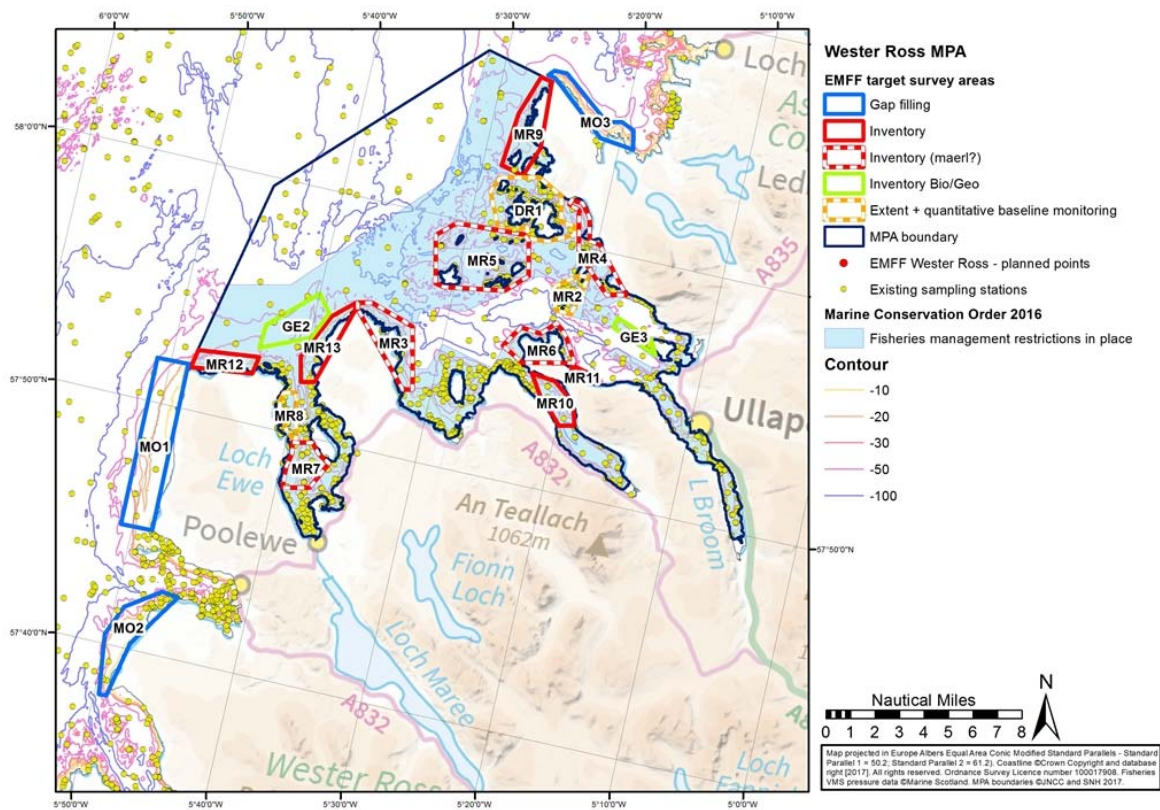


Figure 1. Planned 2018 sampling areas within and adjacent to the Wester Ross MPA.



Figure 2. Drop down video stations surveyed in 2018 in Wester Ross, with initial planned stations in background.

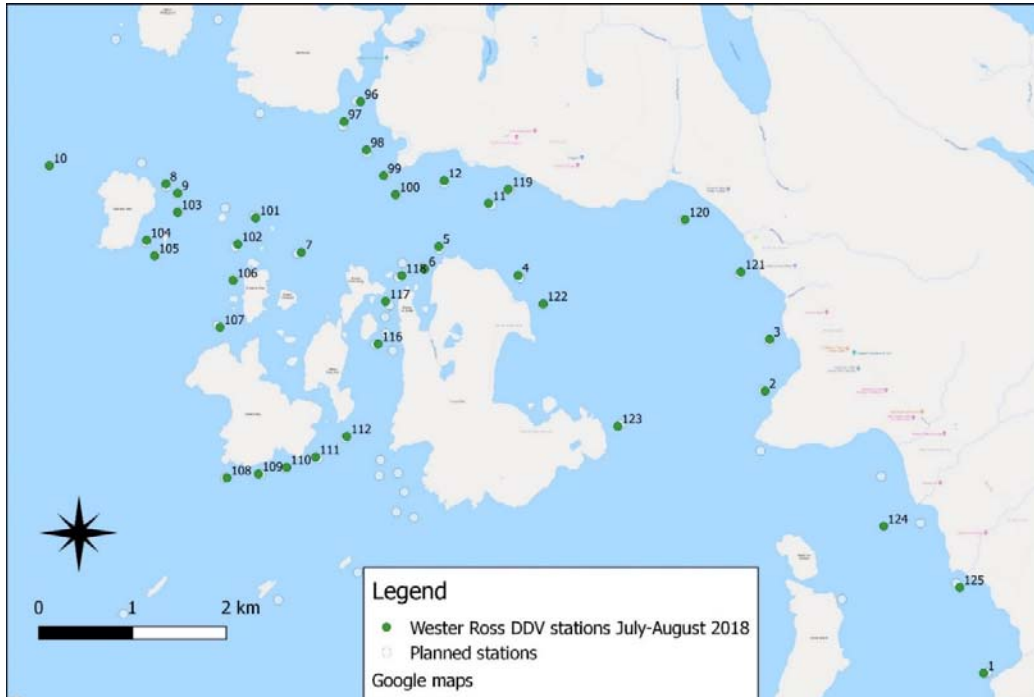


Figure 3. Drop down video stations around Tanera Mor and Beg (polygon DR1 in Figure 1) surveyed in 2018 in Wester Ross, with initially planned stations in background.

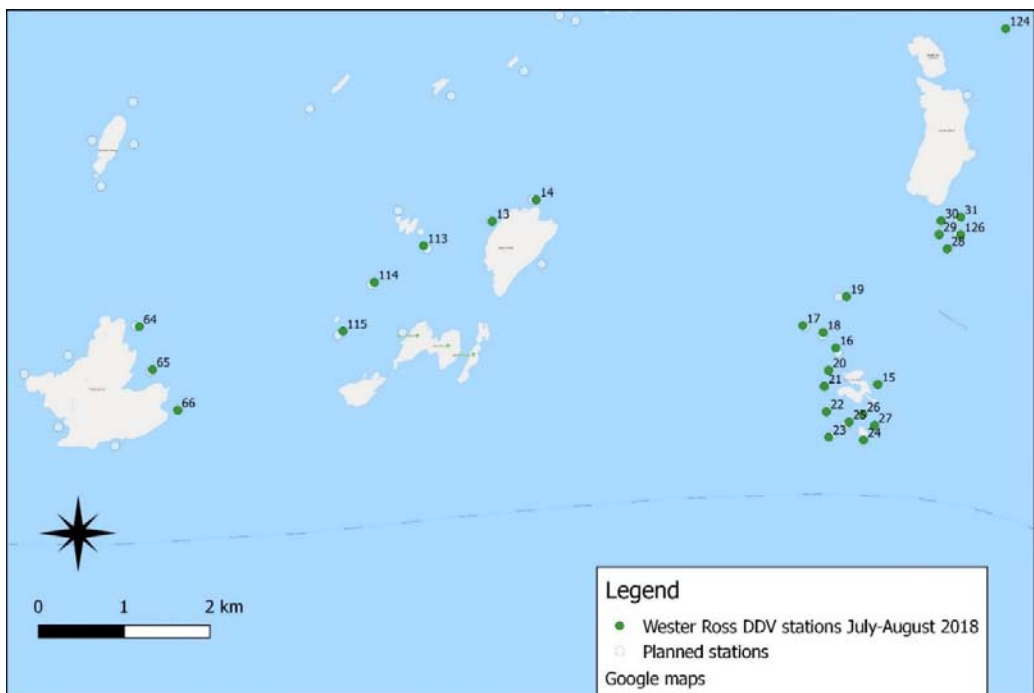


Figure 4. Drop down video stations around the Summer Isles and Skerries (polygon MR5 in Figure 1) surveyed in 2018 in Wester Ross, with initially planned stations in background.



Figure 5. Drop down video stations around Little and outer Loch Broom (polygons MR6, 10 and 11 in Figure 1) surveyed in 2018 in Wester Ross, with initially planned stations in background.



Figure 6. Drop down video stations around Loch Ewe and Mellon Udrigle (polygons MR3, 7, 8, 12, 13 and GE2 in Figure 1) surveyed in 2018 in Wester Ross, with initially planned stations in background.

Table 1 Wester Ross sampling station locations, July-August 2018

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	Wester Ross	1	Horse Island	DDV	30/07/2018	10:22:00	57	59.047	-5	18.875	10:27:00	57	59.060	-5	18.954
MS EMFF	Wester Ross	2	Badentarbert bay	DDV	30/07/2018	10:52:00	58	0.668	-5	21.241	10:57:00	58	0.694	-5	21.279
MS EMFF	Wester Ross	3	South Achiltibuie	DDV	30/07/2018	11:05:00	58	0.964	-5	21.192	11:10:00	58	0.978	-5	21.189
MS EMFF	Wester Ross	4	Tanera Mor and Beg	DDV	30/07/2018	11:26:00	58	1.332	-5	23.915	11:32:00	58	1.393	-5	23.947
MS EMFF	Wester Ross	5	Tanera Mor and Beg	DDV	30/07/2018	11:43:00	58	1.497	-5	24.774	11:48:00	58	1.551	-5	24.739
MS EMFF	Wester Ross	6	Tanera Mor and Beg	DDV	30/07/2018	11:59:00	58	1.368	-5	24.927	12:05:00	58	1.434	-5	24.867
MS EMFF	Wester Ross	7	Tanera Mor and Beg	DDV	30/07/2018	12:18:00	58	1.463	-5	26.262	12:24:00	58	1.531	-5	26.216
MS EMFF	Wester Ross	8	Tanera Mor and Beg	DDV	30/07/2018	12:38:00	58	1.855	-5	27.727	12:45:00	58	1.968	-5	27.685
MS EMFF	Wester Ross	9	Tanera Mor and Beg	DDV	30/07/2018	12:55:00	58	1.802	-5	27.601	13:01:00	58	1.899	-5	27.553
MS EMFF	Wester Ross	10	Tanera Mor and Beg	DDV	30/07/2018	13:09:00	58	1.961	-5	27.995	13:15:00	58	2.013	-5	27.919
MS EMFF	Wester Ross	11	Dornie Sound	DDV	30/07/2018	14:06:00	58	1.744	-5	24.235	14:12:00	58	1.784	-5	24.217
MS EMFF	Wester Ross	12	Dornie Sound	DDV	30/07/2018	14:18:00	58	1.874	-5	24.715	14:26:00	58	1.918	-5	24.666
MS EMFF	Wester Ross	13	Summer Isles	DDV	30/07/2018	14:58:00	57	58.680	-5	26.029	15:04:00	57	58.728	-5	25.976
MS EMFF	Wester Ross	14	Summer Isles	DDV	30/07/2018	15:10:00	57	58.817	-5	25.509	15:15:00	57	58.833	-5	25.388
MS EMFF	Wester Ross	15	Skerries	DDV	30/07/2018	15:40:00	57	57.655	-5	21.469	15:47:00	57	57.656	-5	21.380
MS EMFF	Wester Ross	16	Skerries	DDV	30/07/2018	15:54:00	57	57.885	-5	21.966	16:04:00	57	57.923	-5	21.841
MS EMFF	Wester Ross	17	Skerries	DDV	31/07/2018	08:17:00	57	58.026	-5	22.357	08:25:00	57	58.066	-5	22.422
MS EMFF	Wester Ross	18	Skerries	DDV	31/07/2018	08:35:00	57	57.982	-5	22.116	08:42:00	57	58.009	-5	22.140
MS EMFF	Wester Ross	19	Skerries	DDV	31/07/2018	08:50:00	57	58.208	-5	21.841	08:57:00	57	58.259	-5	21.871
MS EMFF	Wester Ross	20	Skerries	DDV	31/07/2018	09:08:00	57	57.745	-5	22.051	09:16:00	57	57.786	-5	22.078
MS EMFF	Wester Ross	21	Skerries	DDV	31/07/2018	09:22:00	57	57.644	-5	22.102	09:31:00	57	57.698	-5	22.156

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MS EMFF	Wester Ross	22	Skerries	DDV	31/07/2018	09:40:00	57	57.485	-5	22.077	09:46:00	57	57.526	-5	22.130
MS EMFF	Wester Ross	23	Skerries	DDV	31/07/2018	09:53:00	57	57.325	-5	22.050	09:59:00	57	57.372	-5	22.119
MS EMFF	Wester Ross	24	Skerries	DDV	31/07/2018	10:08:00	57	57.308	-5	21.639	10:12:00	57	57.336	-5	21.662
MS EMFF	Wester Ross	25	Skerries	DDV	31/07/2018	10:29:00	57	57.420	-5	21.811	10:38:00	57	57.481	-5	21.882
MS EMFF	Wester Ross	26	Skerries	DDV	31/07/2018	10:44:00	57	57.468	-5	21.648	10:50:00	57	57.509	-5	21.702
MS EMFF	Wester Ross	27	Skerries	DDV	31/07/2018	10:57:00	57	57.399	-5	21.509	11:05:00	57	57.454	-5	21.551
MS EMFF	Wester Ross	28	Skerries	DDV	31/07/2018	11:21:00	57	58.509	-5	20.648	11:30:00	57	58.557	-5	20.763
MS EMFF	Wester Ross	29	Skerries	DDV	31/07/2018	11:35:00	57	58.598	-5	20.744	11:41:00	57	58.647	-5	20.813
MS EMFF	Wester Ross	30	Skerries	DDV	31/07/2018	11:46:00	57	58.683	-5	20.722	11:53:00	57	58.733	-5	20.784
MS EMFF	Wester Ross	31	Skerries	DDV	31/07/2018	12:02:00	57	58.706	-5	20.491	12:10:00	57	58.778	-5	20.583
MS EMFF	Wester Ross	32	Little Loch Broom	DDV	31/07/2018	13:02:00	57	55.850	-5	24.502	13:07:00	57	55.921	-5	24.491
MS EMFF	Wester Ross	33	Little Loch Broom	DDV	31/07/2018	13:14:00	57	56.077	-5	23.902	13:19:00	57	56.117	-5	23.913
MS EMFF	Wester Ross	34	Little Loch Broom	DDV	31/07/2018	13:28:00	57	55.926	-5	23.196	13:33:00	57	55.960	-5	23.197
MS EMFF	Wester Ross	35	Little Loch Broom	DDV	31/07/2018	13:40:00	57	56.064	-5	22.827	13:46:00	57	56.107	-5	22.828
MS EMFF	Wester Ross	36	Little Loch Broom	DDV	31/07/2018	13:53:00	57	55.955	-5	22.383	13:58:00	57	56.001	-5	22.383
MS EMFF	Wester Ross	37	Little Loch Broom	DDV	31/07/2018	14:04:00	57	56.262	-5	22.419	14:09:00	57	56.309	-5	22.393
MS EMFF	Wester Ross	38	Little Loch Broom	DDV	31/07/2018	14:19:00	57	56.368	-5	21.942	14:25:00	57	56.408	-5	21.929
MS EMFF	Wester Ross	39	Little Loch Broom	DDV	31/07/2018	14:35:00	57	56.240	-5	21.115	14:40:00	57	56.306	-5	21.132
MS EMFF	Wester Ross	40	Little Loch Broom	DDV	31/07/2018	14:50:00	57	55.901	-5	20.932	14:55:00	57	55.963	-5	20.900
MS EMFF	Wester Ross	41	Little Loch Broom	DDV	31/07/2018	15:06:00	57	55.482	-5	20.704	15:11:00	57	55.524	-5	20.695
MS EMFF	Wester Ross	42	Little Loch Broom	DDV	31/07/2018	15:19:00	57	55.336	-5	20.409	15:24:00	57	55.375	-5	20.401
MS EMFF	Wester Ross	43	Little Loch Broom	DDV	31/07/2018	15:34:00	57	55.076	-5	19.767	15:39:00	57	55.128	-5	19.783

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MS EMFF	Wester Ross	44	Little Loch Broom	DDV	31/07/2018	15:49:00	57	54.862	-5	19.257	15:54:00	57	54.902	-5	19.263
MS EMFF	Wester Ross	45	Little Loch Broom	DDV	01/08/2018	08:57:00	57	54.389	-5	21.922	09:03:00	57	54.403	-5	21.881
MS EMFF	Wester Ross	46	Little Loch Broom	DDV	01/08/2018	09:10:00	57	54.295	-5	21.102	09:15:00	57	54.316	-5	21.075
MS EMFF	Wester Ross	47	Little Loch Broom	DDV	01/08/2018	09:23:00	57	54.029	-5	20.307	09:28:00	57	54.043	-5	20.279
MS EMFF	Wester Ross	48	Little Loch Broom	DDV	01/08/2018	09:38:00	57	53.590	-5	19.350	09:43:00	57	53.614	-5	19.337
MS EMFF	Wester Ross	49	Little Loch Broom	DDV	01/08/2018	09:52:00	57	53.217	-5	18.932	09:58:00	57	53.243	-5	18.914
MS EMFF	Wester Ross	50	Little Loch Broom	DDV	01/08/2018	10:09:00	57	52.903	-5	20.327	10:20:00	57	52.934	-5	20.271
MS EMFF	Wester Ross	51	Little Loch Broom	DDV	01/08/2018	10:25:00	57	53.200	-5	20.803	10:31:00	57	53.220	-5	20.781
MS EMFF	Wester Ross	52	Little Loch Broom	DDV	01/08/2018	10:38:00	57	53.357	-5	21.112	10:45:00	57	53.379	-5	21.104
MS EMFF	Wester Ross	53	Little Loch Broom	DDV	01/08/2018	10:53:00	57	53.539	-5	20.519	10:58:00	57	53.562	-5	20.498
MS EMFF	Wester Ross	54	Little Loch Broom	DDV	01/08/2018	11:04:00	57	53.791	-5	20.278	11:11:00	57	53.809	-5	20.266
MS EMFF	Wester Ross	55	Mellon Udrigle	DDV	01/08/2018	12:16:00	57	53.793	-5	32.733	12:22:00	57	53.842	-5	32.669
MS EMFF	Wester Ross	56	Mellon Udrigle	DDV	01/08/2018	12:31:00	57	54.314	-5	32.827	12:37:00	57	54.381	-5	32.774
MS EMFF	Wester Ross	57	Mellon Udrigle	DDV	01/08/2018	12:46:00	57	54.799	-5	32.983	12:51:00	57	54.870	-5	32.966
MS EMFF	Wester Ross	58	Mellon Udrigle	DDV	01/08/2018	12:58:00	57	55.074	-5	33.462	13:04:00	57	55.152	-5	33.489
MS EMFF	Wester Ross	59	Mellon Udrigle	DDV	01/08/2018	13:13:00	57	55.119	-5	34.272	13:18:00	57	55.168	-5	34.234
MS EMFF	Wester Ross	60	Mellon Udrigle	DDV	01/08/2018	13:26:00	57	55.251	-5	34.826	13:32:00	57	55.319	-5	34.845
MS EMFF	Wester Ross	61	Mellon Udrigle	DDV	01/08/2018	13:38:00	57	55.364	-5	35.461	13:44:00	57	55.429	-5	35.482
MS EMFF	Wester Ross	62	Mellon Udrigle	DDV	01/08/2018	13:51:00	57	55.528	-5	36.029	13:56:00	57	55.587	-5	36.073
MS EMFF	Wester Ross	63	Mellon Udrigle	DDV	01/08/2018	14:03:00	57	55.564	-5	36.712	14:09:00	57	55.600	-5	36.645
MS EMFF	Wester Ross	64	Summer Isles	DDV	01/08/2018	14:50:00	57	58.019	-5	30.200	14:56:00	57	58.024	-5	30.155
MS EMFF	Wester Ross	65	Summer Isles	DDV	01/08/2018	15:04:00	57	57.750	-5	30.045	15:09:00	57	57.771	-5	29.991

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MS EMFF	Wester Ross	66	Summer Isles	DDV	01/08/2018	15:15:00	57	57.494	-5	29.746	15:20:00	57	57.489	-5	29.703
MS EMFF	Wester Ross	67	Loch Ewe	DDV	02/08/2018	07:32:00	57	49.110	-5	36.956	07:41:00	57	49.168	-5	36.898
MS EMFF	Wester Ross	68	Loch Ewe	DDV	02/08/2018	07:47:00	57	49.259	-5	37.349	07:53:00	57	49.306	-5	37.322
MS EMFF	Wester Ross	69	Loch Ewe	DDV	02/08/2018	07:59:00	57	49.395	-5	37.748	08:04:00	57	49.449	-5	37.731
MS EMFF	Wester Ross	70	Loch Ewe	DDV	02/08/2018	08:19:00	57	48.141	-5	37.722	08:26:00	57	48.186	-5	37.719
MS EMFF	Wester Ross	71	Loch Ewe	DDV	02/08/2018	08:39:00	57	48.101	-5	39.230	08:44:00	57	48.177	-5	39.205
MS EMFF	Wester Ross	72	Loch Ewe	DDV	02/08/2018	08:50:00	57	48.541	-5	39.319	08:56:00	57	48.620	-5	39.295
MS EMFF	Wester Ross	73	Loch Ewe	DDV	02/08/2018	09:03:00	57	48.597	-5	38.410	09:09:00	57	48.655	-5	38.384
MS EMFF	Wester Ross	74	Loch Ewe	DDV	02/08/2018	09:19:00	57	48.998	-5	39.129	09:24:00	57	49.068	-5	39.104
MS EMFF	Wester Ross	75	Loch Ewe	DDV	02/08/2018	09:32:00	57	49.536	-5	39.080	09:38:00	57	49.586	-5	39.087
MS EMFF	Wester Ross	76	Loch Ewe	DDV	02/08/2018	09:44:00	57	49.866	-5	39.601	09:53:00	57	49.949	-5	39.594
MS EMFF	Wester Ross	77	Loch Ewe	DDV	02/08/2018	10:01:00	57	50.155	-5	40.003	10:09:00	57	50.229	-5	39.962
MS EMFF	Wester Ross	78	Loch Ewe	DDV	02/08/2018	10:16:00	57	50.491	-5	40.325	10:24:00	57	50.568	-5	40.314
MS EMFF	Wester Ross	79	Loch Ewe	DDV	02/08/2018	10:32:00	57	50.755	-5	40.486	10:40:00	57	50.849	-5	40.466
MS EMFF	Wester Ross	80	Loch Ewe	DDV	02/08/2018	10:48:00	57	51.310	-5	40.589	10:57:00	57	51.324	-5	40.574
MS EMFF	Wester Ross	81	West of Loch Ewe	DDV	02/08/2018	11:46:00	57	51.865	-5	48.295	11:50:00	57	51.906	-5	48.242
MS EMFF	Wester Ross	82	West of Loch Ewe	DDV	02/08/2018	11:57:00	57	51.805	-5	47.614	12:03:00	57	51.869	-5	47.660
MS EMFF	Wester Ross	83	West of Loch Ewe	DDV	02/08/2018	12:10:00	57	51.901	-5	46.817	12:16:00	57	51.945	-5	46.875
MS EMFF	Wester Ross	84	West of Loch Ewe	DDV	02/08/2018	12:22:00	57	52.046	-5	46.197	12:28:00	57	52.079	-5	46.172
MS EMFF	Wester Ross	85	West of Loch Ewe	DDV	02/08/2018	12:35:00	57	52.306	-5	45.716	12:40:00	57	52.332	-5	45.783
MS EMFF	Wester Ross	86	West of Loch Ewe	DDV	02/08/2018	12:48:00	57	52.280	-5	45.164	12:53:00	57	52.351	-5	45.195
MS EMFF	Wester Ross	87	West of Loch Ewe	DDV	02/08/2018	13:02:00	57	52.220	-5	44.295	13:07:00	57	52.253	-5	44.316

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MS EMFF	Wester Ross	88	West of Loch Ewe	DDV	02/08/2018	13:13:00	57	52.328	-5	43.833	13:23:00	57	52.372	-5	43.858
MS EMFF	Wester Ross	89	Loch Ewe Entrance	DDV	02/08/2018	13:39:00	57	53.661	-5	43.360	13:44:00	57	53.693	-5	43.326
MS EMFF	Wester Ross	90	Loch Ewe Entrance	DDV	02/08/2018	13:59:00	57	54.175	-5	41.537	14:04:00	57	54.203	-5	41.490
MS EMFF	Wester Ross	91	Loch Ewe Entrance	DDV	02/08/2018	14:11:00	57	54.175	-5	41.176	14:16:00	57	54.194	-5	41.131
MS EMFF	Wester Ross	92	Loch Ewe Entrance	DDV	02/08/2018	14:26:00	57	53.994	-5	40.746	14:31:00	57	54.007	-5	40.697
MS EMFF	Wester Ross	93	E of Loch Ewe Entrance	DDV	02/08/2018	14:44:00	57	53.811	-5	39.088	14:49:00	57	53.848	-5	39.028
MS EMFF	Wester Ross	94	E of Loch Ewe Entrance	DDV	02/08/2018	14:58:00	57	53.354	-5	39.675	15:03:00	57	53.404	-5	39.627
MS EMFF	Wester Ross	95	E of Loch Ewe Entrance	DDV	02/08/2018	15:15:00	57	52.781	-5	39.710	15:20:00	57	52.872	-5	39.670
MS EMFF	Wester Ross	96	Rieff	DDV	03/08/2018	10:53:00	58	2.327	-5	25.621	10:58:00	58	2.327	-5	25.524
MS EMFF	Wester Ross	97	Tanera Mor and Beg	DDV	03/08/2018	11:03:00	58	2.213	-5	25.800	11:12:00	58	2.246	-5	25.792
MS EMFF	Wester Ross	98	Tanera Mor and Beg	DDV	03/08/2018	11:17:00	58	2.052	-5	25.556	11:25:00	58	2.104	-5	25.558
MS EMFF	Wester Ross	99	Tanera Mor and Beg	DDV	03/08/2018	11:30:00	58	1.903	-5	25.371	11:37:00	58	1.915	-5	25.453
MS EMFF	Wester Ross	100	Tanera Mor and Beg	DDV	03/08/2018	11:44:00	58	1.794	-5	25.243	11:52:00	58	1.78	-5	25.325
MS EMFF	Wester Ross	101	Tanera Mor and Beg	DDV	03/08/2018	12:02:00	58	1.660	-5	26.756	12:10:00	58	1.657	-5	26.697
MS EMFF	Wester Ross	102	Tanera Mor and Beg	DDV	03/08/2018	12:16:00	58	1.510	-5	26.950	12:24:00	58	1.527	-5	26.924
MS EMFF	Wester Ross	103	Tanera Mor and Beg	DDV	03/08/2018	12:32:00	58	1.693	-5	27.603	12:38:00	58	1.729	-5	27.577
MS EMFF	Wester Ross	104	Tanera Mor and Beg	DDV	03/08/2018	12:45:00	58	1.533	-5	27.937	12:52:00	58	1.587	-5	27.885
MS EMFF	Wester Ross	105	Tanera Mor and Beg	DDV	03/08/2018	13:24:00	58	1.444	-5	27.850	13:27:00	58	1.451	-5	27.804
MS EMFF	Wester Ross	106	Tanera Mor and Beg	DDV	03/08/2018	13:35:00	58	1.303	-5	27.000	13:42:00	58	1.332	-5	27.051
MS EMFF	Wester Ross	107	Tanera Mor and Beg	DDV	03/08/2018	13:49:00	58	1.034	-5	27.155	13:56:00	58	1.061	-5	27.107
MS EMFF	Wester Ross	108	Tanera Mor and Beg	DDV	03/08/2018	14:08:00	58	0.169	-5	27.071	14:14:00	58	0.198	-5	27.082
MS EMFF	Wester Ross	109	Tanera Mor and Beg	DDV	03/08/2018	14:20:00	58	0.194	-5	26.73	14:26:00	58	0.212	-5	26.732

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	Wester Ross	110	Tanera Mor and Beg	DDV	03/08/2018	14:31:00	58	0.232	-5	26.423	14:38:00	58	0.269	-5	26.42
MS EMFF	Wester Ross	111	Tanera Mor and Beg	DDV	03/08/2018	14:44:00	58	0.288	-5	26.113	14:51:00	58	0.318	-5	26.049
MS EMFF	Wester Ross	112	Tanera Mor and Beg	DDV	03/08/2018	14:57:00	58	0.404	-5	25.77	15:03:00	58	0.435	-5	25.671
MS EMFF	Wester Ross	113	Summer Isles	DDV	04/08/2018	09:00:00	57	58.528	-5	26.840	09:05:00	57	58.565	-5	26.760
MS EMFF	Wester Ross	114	Summer Isles	DDV	04/08/2018	09:13:00	57	58.297	-5	27.422	09:17:00	57	58.327	-5	27.366
MS EMFF	Wester Ross	115	Summer Isles	DDV	04/08/2018	09:26:00	57	57.990	-5	27.793	09:30:00	57	58.024	-5	27.727
MS EMFF	Wester Ross	116	Tanera Mor and Beg	DDV	04/08/2018	10:07:00	58	0.937	-5	25.431	10:15:00	58	1.013	-5	25.326
MS EMFF	Wester Ross	117	Tanera Mor and Beg	DDV	04/08/2018	10:19:00	58	1.181	-5	25.350	10:26:00	58	1.279	-5	25.226
MS EMFF	Wester Ross	118	Tanera Mor and Beg	DDV	04/08/2018	10:30:00	58	1.330	-5	25.174	10:37:00	58	1.424	-5	25.038
MS EMFF	Wester Ross	119	Tanera Mor and Beg	DDV	04/08/2018	10:52:00	58	1.824	-5	24.022	10:59:00	58	1.860	-5	23.968
MS EMFF	Wester Ross	120	South of Achiltibuie	DDV	04/08/2018	11:14:00	58	1.651	-5	22.108	11:19:00	58	1.684	-5	22.046
MS EMFF	Wester Ross	121	South of Achiltibuie	DDV	04/08/2018	11:27:00	58	1.351	-5	21.503	11:31:00	58	1.386	-5	21.454
MS EMFF	Wester Ross	122	Tanera Mor and Beg	DDV	04/08/2018	12:15:00	58	1.167	-5	23.643	12:22:00	58	1.227	-5	23.600
MS EMFF	Wester Ross	123	Tanera Mor and Beg	DDV	04/08/2018	12:33:00	58	0.464	-5	22.836	12:41:00	58	0.500	-5	22.761
MS EMFF	Wester Ross	124	South of Achiltibuie	DDV	04/08/2018	12:58:00	57	59.891	-5	19.957	13:03:00	57	59.905	-5	19.876
MS EMFF	Wester Ross	125	South of Achiltibuie	DDV	04/08/2018	13:11:00	57	59.540	-5	19.133	13:16:00	57	59.555	-5	19.059
MS EMFF	Wester Ross	126	Inner Summer Isles	DDV	04/08/2018	13:31:00	57	58.596	-5	20.491	13:37:00	57	58.626	-5	20.404
MS EMFF	Wester Ross	127	Outer Loch Broom	DDV	04/08/2018	14:07:00	57	57.245	-5	17.166	14:12:00	57	57.266	-5	17.062
MS EMFF	Wester Ross	128	Outer Loch Broom	DDV	04/08/2018	14:19:00	57	57.013	-5	16.542	14:24:00	57	57.028	-5	16.436
MS EMFF	Wester Ross	129	Outer Loch Broom	DDV	04/08/2018	14:31:00	57	56.987	-5	15.779	14:36:00	57	57.002	-5	15.683
MS EMFF	Wester Ross	130	Outer Loch Broom	DDV	04/08/2018	14:49:00	57	56.433	-5	14.152	14:54:00	57	56.442	-5	14.061

Table 2 Wester Ross sampling station descriptions, July-August 2018

Station ref	Site name	Date sampled	Start Depth (m BCD)	End Depth (m BCD)	Vessel speed Kn	Video duration	Video quality	Seabed physical type	Notes on fauna & flora
1	Horse Island	30/07/2018	16	28	0.5	00:05	Good	Sandy gravel with some cobbles	Echinoderms, sugar kelp,urchins,asterias
2	Badentarbert bay	30/07/2018	18	21	0.5	00:05	Good	Rocky sandy shale	Fluffy,urchins,asterias,kelp
3	South Achiltibuie	30/07/2018	19	18	0.2	00:05	Good	Sandy cobble	Fluffy, sugar kelp
4	Tanera Mor and Beg	30/07/2018	31	48	0.5	00:06	Good	Sandy	Barren
5	Tanera Mor and Beg	30/07/2018	28	43	0.5	00:05	Good	Sandy	Some urchins, mainly barren
6	Tanera Mor and Beg	30/07/2018	16	13	0.9	00:06	Good	Sandy, some rock	Turf tufts, starfish,urchins
7	Tanera Mor and Beg	30/07/2018	33	43	0.7	00:06	Good	Sand, burrowed mud	Starfish
8	Tanera Mor and Beg	30/07/2018	29	45	1	00:07	Good	Sand, maerl patches	
9	Tanera Mor and Beg	30/07/2018	33	46	1	00:06	Good	Sand, sand ripples, maerl	Urchins
10	Tanera Mor and Beg	30/07/2018	25	32	0.5	00:06	Good	Pebbles, sand,boulders with maerl	Urchins and starfish
11	Dornie Sound	30/07/2018	22	25	0.4	00:06	Good	Sand, cobbles. Some burrows	Urchins,turf tufts
12	Dornie Sound	30/07/2018	22	17	0.4	00:08	Good	Sandy with burrows	Starfish and turf tufts
13	Summer Isles	30/07/2018	16	17	0.7	00:06	Good	Boulders and cobbles	Algae, urchins, kelp and starfish
14	Summer Isles	30/07/2018	25	40	0.7	00:05	Good	Sand with burrows	
15	Skerries	30/07/2018	16	23	0.2	00:07	Good	Sand with burrows	Turf tufts
16	Skerries	30/07/2018	22	23	0.4	00:10	Good	Cobbles, sandy mud with burrows	Maerl
17	Skerries	31/07/2018	23	25	0.4	00:08	Good	Boulders,maerl on rocks, sand patches with burrows	Maerl, starfish, turf
18	Skerries	31/07/2018	31	35	0.4	00:07	Good	Sand, pebbles	Urchins, starfish
19	Skerries	31/07/2018	27	32	0.3	00:07	Good	Cobbles in sand with burrows	Urchins
20	Skerries	31/07/2018	18	24	0.4	00:08	Good	Coarse sand and maerl	Turf, starfish, maerl
21	Skerries	31/07/2018	25	28	0.4	00:09	Good	Coarse sand with burrows.	Maerl, starfish, turf
22	Skerries	31/07/2018	30	32	0.5	00:06	Good	Coarse sand with burrows.	Maerl, starfish
23	Skerries	31/07/2018	28	32	0.5	00:06	Good	Coarse sand and maerl with burrows, cobbles.	Starfish, maerl
24	Skerries	31/07/2018	19	9	0.5	00:04	Good	Coarse sand	Maerl? Turf, kelp, brittlestars
25	Skerries	31/07/2018	20	20	0.4	00:09	Good	Coarse sand	Maerl, turf, kelp, urchins
26	Skerries	31/07/2018	16	15	0.7	00:06	Good	Sand, pebbles	Starfish, fluff
27	Skerries	31/07/2018	18	14	0.5	00:08	Good	Sand, pebbles	Small patches maerl? Fluff and starfish
28	Skerries	31/07/2018	21	17	0.6	00:09	Good	Sand, pebbles, boulders	Maerl patches, starfish, sugar kelp
29	Skerries	31/07/2018	20	25	0.6	00:06	Good	Boulders, sandy pebble with burrows	Urchins, starfish, anemonies
30	Skerries	31/07/2018	20	25	0.5	00:07	Good	Sandy patches with burrows, cobbles	Urchins, starfish, fluff
31	Skerries	31/07/2018	24	35	0.7	00:08	Good	Barren sand and pebble	Algae, urchins, sugar kelp

Station ref	Site name	Date sampled	Start Depth (m BCD)	End Depth (m BCD)	Vessel speed Kn	Video duration	Video quality	Seabed physical type	Notes on fauna & flora
32	Little Loch Broom	31/07/2018	16	17	0.4	00:05	Good	Cobbles, boulders, sand and maerl patches	Maerl, kelp, brittlestars, algae, urchins
33	Little Loch Broom	31/07/2018	11	14	0.4	00:05	Good	Rocky boulders, sand, maerl patches	Maerl, kelp forest
34	Little Loch Broom	31/07/2018	15	39	0.3	00:05	Good	Barren sand and pebble	Fluff
35	Little Loch Broom	31/07/2018	21	26	0.5	00:06	Good	Sand with burrows, odd boulders	Starfish
36	Little Loch Broom	31/07/2018	12	15	0.5	00:05	Good	Sand, pebbles	Fluff, algae, kelp, urchins, featherstar
37	Little Loch Broom	31/07/2018	22	44	0.6	00:05	Good	Sandy, cobbles	Urchins, starfish, squats
38	Little Loch Broom	31/07/2018	18	26	0.5	00:06	Good	Sandy patches, cobbles, boulders	Urchins, starfish, crabs, fluff, squats, fish
39	Little Loch Broom	31/07/2018	30	34	0.7	00:05	Good	Burrowed sand, pebbles, boulders	Squats, starfish, urchins
40	Little Loch Broom	31/07/2018	20	26	0.7	00:05	Good	Sandy with burrows, pebbles, boulders at end	Algae, fluff, urchins
41	Little Loch Broom	31/07/2018	14	21	0.4	00:05	Good	Sandy, pebbles, boulders	Fluff, starfish, crab, squats, kelp
42	Little Loch Broom	31/07/2018	15	17	0.7	00:05	Good	Sandy, pebbles, boulders	Fluff, urchins, algae, kelp
43	Little Loch Broom	31/07/2018	24	28	0.5	00:05	Good	Sandy, pebbles, boulders	Starfish, urchin, kelp, encrusting algae
44	Little Loch Broom	31/07/2018	25	29	0.4	00:05	Good	Pebbly sand with burrows and boulders	Starfish, squats, fluff, encrusting algae
45	Little Loch Broom	01/08/2018	19	16	0.4	00:06	Good	Sandy gravel with burrows. Occasional boulders	Starfish, kelp, urchins, fluff
46	Little Loch Broom	01/08/2018	21	19	0.3	00:05	Good	Sand and mud with burrows	Sugar kelp, queenies, starfish
47	Little Loch Broom	01/08/2018	21	19	0.3	00:05	Good	Sand and gravel with burrows. Maerl patches	Maerl, starfish, fluff, sea-pens
48	Little Loch Broom	01/08/2018	19	15	0.3	00:05	Good	Gravel, maerl beds	Maerl, sugar kelp, brittlestars, cushion stars, urchins
49	Little Loch Broom	01/08/2018	22	12	0.3	00:06	Good	Gravel	Sugar kelp, green algae, worm tubes, razor shells
50	Little Loch Broom	01/08/2018	14	32	0.3	00:11	Good	Sand, cobbles, mud sand burrows	Fluff, starfish
51	Little Loch Broom	01/08/2018	23	33	0.3	00:06	Good	Sand with burrows, gravel, possible maerl?	Maerl?, cushion star, fluff
52	Little Loch Broom	01/08/2018	26	34	0.5	00:07	Good	Sand, gravel, maerl?, burrows	Cushion star
53	Little Loch Broom	01/08/2018	45	47	0.3	00:05	Good	Mud, burrows	Squats, sea-pens
54	Little Loch Broom	01/08/2018	48	40	0.4	00:07	Good	Mud, burrows	Nephrops
55	Mellon Udrigle	01/08/2018	20	22	0.6	00:06	Good	Muddy sand with burrows	Crabs,
56	Mellon Udrigle	01/08/2018	22	21	0.5	00:06	Good	Sand, cobbles	Urchin, sugar kelp, starfish, fluff
57	Mellon Udrigle	01/08/2018	20	31	0.6	00:05	Good	Rock with sand patches	Fish, fluff, urchin, starfish, coralline
58	Mellon Udrigle	01/08/2018	15	29	0.8	00:06	Good	Rocks with sand patches, moving to sand and boulders	Starfish, urchins, L. digitalis
59	Mellon Udrigle	01/08/2018	26	28	0.6	00:05	Good	Sand with cobbles	Urchins, starfish, fish

Station ref	Site name	Date sampled	Start Depth (m BCD)	End Depth (m BCD)	Vessel speed Kn	Video duration	Video quality	Seabed physical type	Notes on fauna & flora
60	Mellon Udrigle	01/08/2018	18	22	0.8	00:06	Good	Sand	Starfish, fish, urchin, L. digitalis
61	Mellon Udrigle	01/08/2018	22	25	0.6	00:06	Good	Bedrock and sand and boulders	Starfish, urchins, L. digitalis, fluff
62	Mellon Udrigle	01/08/2018	19	18	0.5	00:05	Good	Sand, boulders	Starfish, fluff, L. digitalis, dead mans fingers
63	Mellon Udrigle	01/08/2018	18	23	0.5	00:06	Good	Cobbles, boulders, sandy patches, maerl and gravel	Maerl?, L. digitalis, urchins and starfish
64	Summer Isles	01/08/2018	27	31	0.3	00:06	Good	Sand with cobbles	Urchins, starfish
65	Summer Isles	01/08/2018	20	25	0.4	00:05	Good	Sand with boulders and burrows	Fluff, kelp, starfish, urchin, featherstars
66	Summer Isles	01/08/2018	16	20	0.4	00:05	Good	Sand, cobbles and boulders	Brittlestars, urchins, featherstars, kelp
67	Loch Ewe	02/08/2018	16	13	0.5	00:09	Good	sand	fluff, urchins,
68	Loch Ewe	02/08/2018	16	13	0.6	00:06	Good	Sandy patches, boulders and some maerl	maerl? Starfish, urchins
69	Loch Ewe	02/08/2018	22	17	0.6	00:05	Good	Muddy sand with burrows	Starfish, fluff
70	Loch Ewe	02/08/2018	24	24	0.4	00:07	Good	muddy sand, burrows, rocks boulders	Encrusting coralline
71	Loch Ewe	02/08/2018	19	19	0.9	00:05	Good	Sandy, broken shell, burrows, mud, cobbles	none
72	Loch Ewe	02/08/2018	19	19	0.9	00:06	Good	Sandy, broken shell, cobbles, boulders	fluff, sacc.
73	Loch Ewe	02/08/2018	34	42	0.7	00:06	Good	Mud with burrows	sea pens, scallops, nephrops, anemones
74	Loch Ewe	02/08/2018	17	17	0.7	00:05	Good	Sandy gravel	fluff, anemones, sacc
75	Loch Ewe	02/08/2018	22	23	0.5	00:06	Good	Sandy gravel	fluff patches
76	Loch Ewe	02/08/2018	17	21	0.6	00:09	Good	Sandy gravel ripples	fluff patches, razor shells, maerl later ?
77	Loch Ewe	02/08/2018	19	28	0.5	00:08	Good	Sandy, broken shell, cobbles, stones	fluff, sacc., feather stars
78	Loch Ewe	02/08/2018	15	17	0.6	00:08	Good	Maerl patches, sand, shelly gravel	fluff patches, maerl
79	Loch Ewe	02/08/2018	19	18	0.7	00:08	Good	Maerl bed, dead shells, gravel, mega ripples in sand	maerl, sacc
80	Loch Ewe	02/08/2018	21	22	0.8	00:09	Good	Sandy gravel, cobbles, broken shell, sand, boulders	Fluff, kelp,
81	West of Loch Ewe	02/08/2018	20	10	0.7	00:04	Good	Bedrock	kelp
82	West of Loch Ewe	02/08/2018	15	20	0.9	00:06	Good	sand plus bedrock	kelp
83	West of Loch Ewe	02/08/2018	15	17	0.6	00:06	Good	sand	algae into kelp
84	West of Loch Ewe	02/08/2018	17	19	0.4	00:06	Good	bedrock	kelp
85	West of Loch Ewe	02/08/2018	23	26	0.4	00:05	Good	rocky reef, sandy patches	dead mens fingers
86	West of Loch Ewe	02/08/2018	19	23	0.3	00:05	Good	sandy patches, rocks	kelp
87	West of Loch Ewe	02/08/2018	11	15	0.5	00:05	Good	none	kelp
88	West of Loch Ewe	02/08/2018	16	18	0.5	00:10	Good	none	kelp
89	Loch Ewe Entrance	02/08/2018	34	35	0.4	00:05	Good	cobbles and boulders	corline encrusted rock

Station ref	Site name	Date sampled	Start Depth (m BCD)	End Depth (m BCD)	Vessel speed Kn	Video duration	Video quality	Seabed physical type	Notes on fauna & flora
90	Loch Ewe Entrance	02/08/2018	34	34	0.5	00:05	Good	Sandy gravel patches, cobbles and boulders	none
91	Loch Ewe Entrance	02/08/2018	36	39	0.4	00:05	Good	cobbles and boulders	none
92	Loch Ewe Entrance	02/08/2018	52	47	0.4	00:05	Good	Sandy gravel	none
93	E of Loch Ewe Entrance	02/08/2018	14	14	0.4	00:05	Good	none	kelp
94	E of Loch Ewe Entrance	02/08/2018	27	28	0.7	00:05	Good	cobbles, boulders, sandy patches, ripples	maerl?
95	E of Loch Ewe Entrance	02/08/2018	21	22	0.6	00:05	Good	Coarse sand, boulders,	fluff, maerl?
96	Rieff	03/08/2018	15	15	0.2	00:05	Good	Sandy	fucozos,L.sac,razors
97	Tanera Mor and Beg	03/08/2018	20	16	0.3	00:09	Good	Sand	Starfish, razorshells, fucosos
98	Tanera Mor and Beg	03/08/2018	21	19	0.3	00:08	Good	Gravel,bedrock,maerl?	Maerl,cushion stars, featherstars,razor shells, urchins
99	Tanera Mor and Beg	03/08/2018	19	29	0.4	00:07	Good	Sandy gravel, maerl,shell debris	
100	Tanera Mor and Beg	03/08/2018	19	17	0.3	00:08	Good	Sand, pebbles, rock	Laminaria,urchins,fucozos
101	Tanera Mor and Beg	03/08/2018	34	22	0.2	00:08	Good	Sandy gravel, maerl patches, boulders, bedrock	Starfish, featherstars, urchins
102	Tanera Mor and Beg	03/08/2018	40	36	0.2	00:08	Good	Sand, shell debris, barren	Dab
103	Tanera Mor and Beg	03/08/2018	31	33	0.3	00:06	Good	Gravel ridges, shell debris, maerl, barren sand	Razor shells
104	Tanera Mor and Beg	03/08/2018	17	15	0.6	00:07	Good	Maerl ridges	Seaweed
105	Tanera Mor and Beg	03/08/2018	19	16	0.8	00:03	Good	Maerl ridges,gravel,boulders,bedrock, sharp incline	
106	Tanera Mor and Beg	03/08/2018	26	30	0.1	00:07	Good	Stone, large pebbles, ridges (maerl?)	Sparse fauna
107	Tanera Mor and Beg	03/08/2018	11	20	0.2	00:07	Good	Boulder, bedrock, maerl ridges	Dense kelp on boulders, maerl
108	Tanera Mor and Beg	03/08/2018	27	23	0.3	00:06	Good	Maerl ridges,shell debris, pebbles, boulders	
109	Tanera Mor and Beg	03/08/2018	22	17	0.1	00:06	Good	Sand, pebbles, boulders	Urchin, featherstars, starfish
110	Tanera Mor and Beg	03/08/2018	16	13	0.3	00:07	Good	Sandy gravel, shell debris	Razor shells
111	Tanera Mor and Beg	03/08/2018	21	20	0.4	00:07	Good	Coarse sand	Siphon holes, maerl?,razors
112	Tanera Mor and Beg	03/08/2018	21	15	0.6	00:06	Good	Coarse sand and shell	Scattered maerl (dead)?
113	Summer Isles	04/08/2018	29	22	0.5	00:05	Good	Sand ripples, pebble into cobble	Urchin
114	Summer Isles	04/08/2018	18	12	0.6	00:04	Good	Sand patches, bedrock,boulders	Kelp,urchins,fish
115	Summer Isles	04/08/2018	47	48	0.6	00:04	Good	Sand ripples	Urchins, mainly barren
116	Tanera Mor and Beg	04/08/2018	20	15	0.7	00:08	Good	Sand and pebble	Fluff,urchin,kelp, maerl patches?
117	Tanera Mor and Beg	04/08/2018	12	14	1	00:07	Good	Sand and pebble	Fluff, kelp,starfish,razor shells

Station ref	Site name	Date sampled	Start Depth (m BCD)	End Depth (m BCD)	Vessel speed Kn	Video duration	Video quality	Seabed physical type	Notes on fauna & flora
118	Tanera Mor and Beg	04/08/2018	19	49	1	00:07	Good	Sand and shell	Kelp, starfish
119	Tanera Mor and Beg	04/08/2018	26	16	0.3	00:07	Good	Coarse sand	Urchin, fluff, starfish, kelp
120	South of Achiltibuie	04/08/2018	17	15	0.6	00:05	Good	Coarse sand	Kelp, fluff, starfish, razor shells
121	South of Achiltibuie	04/08/2018	15	10	0.5	00:04	Good	Sand and pebbles	Razor shells, fluff, kelp, urchins, starfish
122	Tanera Mor and Beg	04/08/2018	24	30	0.6	00:07	Good	Sany gravel (with burrows)	Urchin, starfish, fluff
123	Tanera Mor and Beg	04/08/2018	20	29	0.4	00:08	Good	Sandy gravel	Fluff, starfish, urchin, fish
124	South of Achiltibuie	04/08/2018	36	30	0.6	00:05	Good	Sandy mud, pebbles, boulder	Urchin, scallop, squats, starfish
125	South of Achiltibuie	04/08/2018	13	5	0.6	00:05	Good	Sandy gravel, cobbles	Kelp, crab, razor shells, fluff, starfish
126	Inner Summer Isles	04/08/2018	21	28	0.5	00:06	Poor	Sandy gravel with burrows, cobble	Fluff, urchin
127	Outer Loch Broom	04/08/2018	28	27	0.7	00:05	Poor	Sand, pebble, cobble, boulders	Urchins, starfish
128	Outer Loch Broom	04/08/2018	32	32	0.7	00:05	Poor	Sand, boulders, pebble, mud	Urchins, starfish
129	Outer Loch Broom	04/08/2018	42	49	0.7	00:05	Poor	Sand, gravel, boulders, mud with burrows	Squats, nephrops
130	Outer Loch Broom	04/08/2018	22	16	0.6	00:05	Poor	Sandy gravel	Razor shells, starfish, urchins, fluff