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

MRV *Alba na Mara*

Survey 1422A

PROGRAMME

19 September – 06 October 2022

Loading: Fraserburgh, 15 September 2022
Unloading: Oban, 06 October 2022

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 cruise ending. In the case of the Survey Summary Report a nil return is required, if appropriate.

Out-turn days per project: 20232 - 18 days

Equipment

3 x SBRUV
6 x Fish trap fleet
2 x Day grab, grab table
2 x Reverser bottles
Minilogger (or equivalent – i.e. DST). (x3)
eDNA Sampling kit
Echo sounder calibration kit

Background and Objectives

1422A will conduct a survey of elasmobranch and gadoid diversity and abundance in predicted suitable habitats to the West of the Hebriides. The primary objective of 1422A is to assess the presence and diversity of elasmobranchs and gadoids in inshore waters and collect environmental data in order to define essential habitat for the target species. The secondary objective of this survey is to develop and calibrate a non-invasive method to assess the presence and abundance of PMFs using eDNA collected in the water column and sediment at the sites where BRUVs (Baited Remote Underwater Video) are deployed. Finally, habitat variables (depth, temperature, sediment type) will be collected using a variety of methods (camera, grab and RoxAnn survey) to study the importance of these variables on fish diversity and abundance and to characterise their respective habitats. More widely, 1422A provides data to assess the status of Priority Marine Features (PMF) including threatened fish species (most elasmobranchs) in the region, gain understanding of the habitat requirements of various species (gadoids and elasmobranchs) and help develop a non-invasive method (eDNA) to assess fish diversity and abundance, which is particularly relevant for the long-term monitoring of Marine Protected Areas (MPA) and future Highly Protected Marine Areas (HPMA).

Objectives

1. To determine the presence and abundance (Nmax) of elasmobranchs (including flapper skate) and juvenile gadoids in inshore waters to the West of the Hebrides.

2. To record substrate features at the points of sampling.

3. To collect DNA from water and sediment samples in order to develop and calibrate a non-invasive detection method.

4. To calibrate the scientific echo sounders at anchor in Scapa Flow.

Embarkation

Scientists will join the vessel on 19 September around 19:00 (BST). Weather permitting *Alba na Mara* will depart the following day from Fraserburgh, heading for Scapa Flow to undertake a calibration of the scientific echo sounders. Once complete, the vessel will sail for Lochinver to exchange staff before steaming for the first survey site.

IMPORTANT NOTE: It is essential that sufficient space is available in the wet lab freezer to store bait

Survey work:

The survey will be split into three distinct activities – Fish traps and baited camera work, Habitat data acquisition (seabed image and sediment sampling) and water sampling for eDNA.

1. Fish traps and Baited cameras
BRUVs and traps will be deployed at or near the centre of grid cells indicated for the two boxes (A and B) in Figure 1 and Table 1.

BRUVs will be equipped with a surface buoy and deployed for 1.5 hours, traps will be equipped with a surface buoy and deployed for 6hours.

2. Substrate classification
To further aid the classification of the substrate at each sampling site, 1422A will acquire RoxAnn records of the surveyed area and a GoPro frame and Day grab will be deployed. Sediment samples will be collected from each grab and stored in the freezer. These will be analysed on return to the laboratory. Once video footages from the BRUVs and GoPro frame are analysed, a visual classification of the substrate will be established.

3. eDNA samples
Water samples will be collected to investigate feasibility of detection of elasmobranchs and gadoids using environmental DNA shed in marine environment. Sampling will take place at locations where BRUVs are deployed (Figure 1). Water samples will be collected using reverser bottles within 5 m from the seabed. Collected water will be filtered through 0.8 micron filters using sterile 50 ml syringe. Sediment and filter samples will be stored at -20℃.

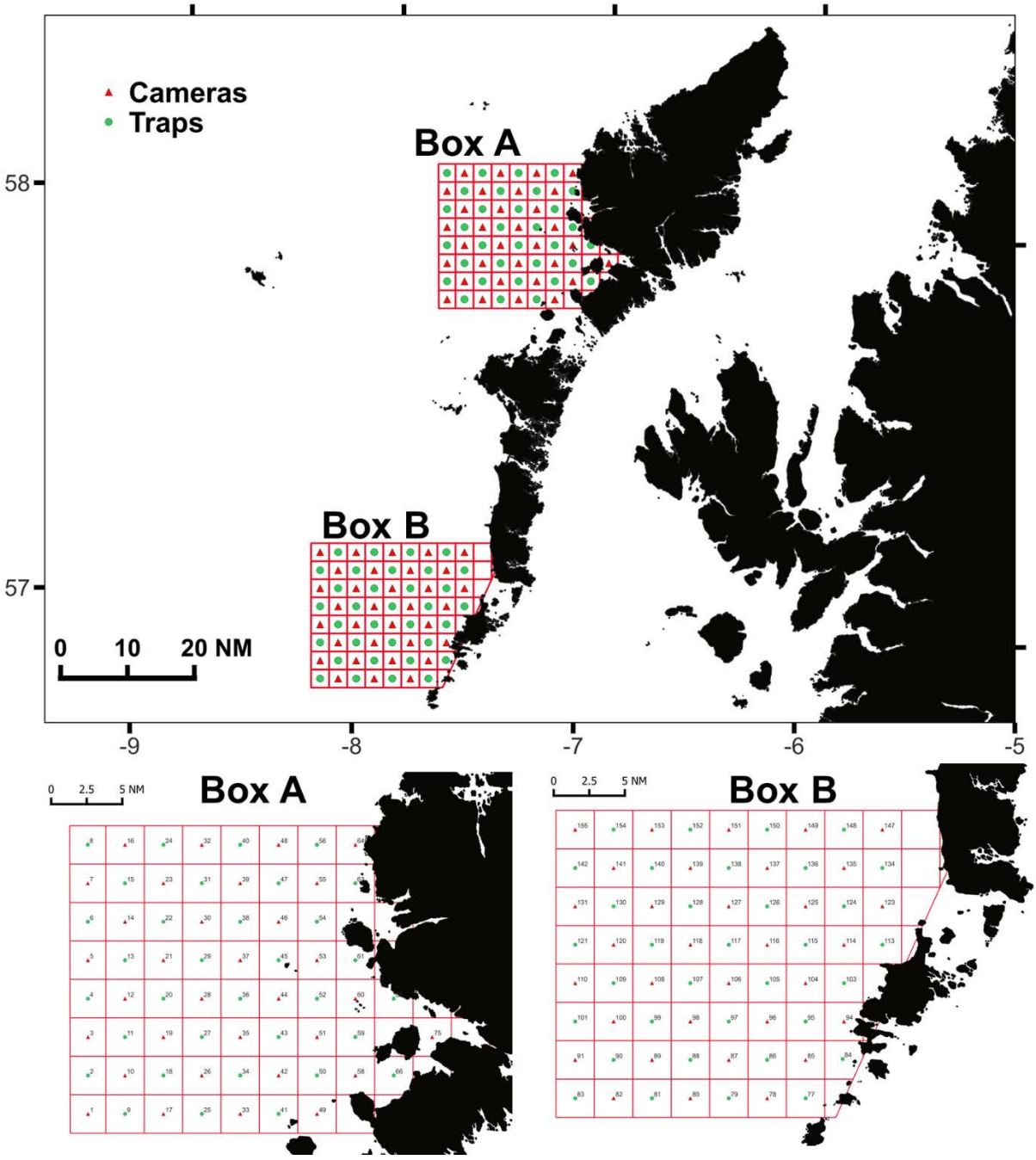

Figure 1: A-Map of 1422A sampling stations with details of boxes A and B.

Box	Latitude	Longitude	latitude (decimal degree)	longitude (decimal degree)	id	depth (m)	Type
A	N57º47.6900'	W007º42.0907'	57.795	-7.702	1	105	BRUV
A	N57º50.3754'	W007º42.4465'	57.840	-7.707	2	108	TRAP
A	N57º53.0607'	W007º42.8034'	57.884	-7.713	3	105	BRUV
A	N57º55.7461'	W007º43.1613'	57.929	-7.719	4	92	TRAP
A	N57º58.4313'	W007º43.5203'	57.974	-7.725	5	86	BRUV
A	N58º01.1166'	W007º43.8804'	58.019	-7.731	6	77	TRAP
A	N58º03.8018'	W007º44.2416'	58.063	-7.737	7	71	BRUV
A	N58º06.4869'	W007º44.6038'	58.108	-7.743	8	58	TRAP
A	N57º47.8677'	W007º37.2519'	57.798	-7.621	9	79	TRAP
A	N57º50.5536'	W007º37.5965'	57.843	-7.627	10	90	BRUV
A	N57º53.2395'	W007º37.9421'	57.887	-7.632	11	112	TRAP
A	N57º55.9253'	W007º38.2887'	57.932	-7.638	12	104	BRUV
A	N57º58.6111'	W007º38.6363'	57.977	-7.644	13	89	TRAP
A	N58º01.2969'	W007º38.9850'	58.022	-7.650	14	86	BRUV
A	N58º03.9826'	W007º39.3347'	58.066	-7.656	15	74	TRAP
A	N58º06.6683'	W007º39.6855'	58.111	-7.661	16	70	BRUV
A	N57º48.0497'	W007º32.2209'	57.801	-7.537	17	54	BRUV
A	N57º50.7360'	W007º32.5592'	57.846	-7.543	18	64	TRAP
A	N57º53.4221'	W007º32.8986'	57.890	-7.548	19	86	BRUV
A	N57º56.1083'	W007º33.2390'	57.935	-7.554	20	105	TRAP
A	N57º58.7944'	W007º33.5804'	57.980	-7.560	21	88	BRUV
A	N58º01.4805'	W007º33.9228'	58.025	-7.565	22	86	TRAP
A	N58º04.1665'	W007º34.2662'	58.069	-7.571	23	78	BRUV
A	N58º06.8525'	W007º34.6107'	58.114	-7.577	24	62	TRAP

A	N57º48.2284'	W007º27.1889'	57.804	-7.453	25	39	TRAP
A	N57º50.9150'	W007º27.5210'	57.849	-7.459	26	45	BRUV
A	N57º53.6015'	W007º27.8542'	57.893	-7.464	27	59	TRAP
A	N57º56.2879'	W007º28.1883'	57.938	-7.470	28	74	BRUV
A	N57º58.9744'	W007º28.5234'	57.983	-7.475	29	102	TRAP
A	N58º01.6607'	W007º28.8596'	58.028	-7.481	30	94	BRUV
A	N58º04.3471'	W007º29.1967'	58.072	-7.487	31	85	TRAP
A	N58º07.0334'	W007º29.5349'	58.117	-7.492	32	72	BRUV
A	N57º48.4038'	W007º22.1558'	57.807	-7.369	33	41	BRUV
A	N57º51.0907'	W007º22.4818'	57.852	-7.375	34	38	TRAP
A	N57º53.7775'	W007º22.8087'	57.896	-7.380	35	39	BRUV
A	N57º56.4642'	W007º23.1366'	57.941	-7.386	36	36	TRAP
A	N57º59.1510'	W007º23.4655'	57.986	-7.391	37	95	BRUV
A	N58º01.8377'	W007º23.7953'	58.031	-7.397	38	102	TRAP
A	N58º04.5243'	W007º24.1262'	58.075	-7.402	39	92	BRUV
A	N58º07.2109'	W007º24.4580'	58.120	-7.408	40	85	TRAP
A	N57º48.5759'	W007º17.1219'	57.810	-7.285	41	32	TRAP
A	N57º51.2630'	W007º17.4416'	57.854	-7.291	42	36	BRUV
A	N57º53.9501'	W007º17.7623'	57.899	-7.296	43	40	TRAP
A	N57º56.6372'	W007º18.0839'	57.944	-7.301	44	41	BRUV
A	N57º59.3242'	W007º18.4065'	57.989	-7.307	45	54	TRAP
A	N58º02.0112'	W007º18.7301'	58.034	-7.312	46	97	BRUV
A	N58º04.6982'	W007º19.0546'	58.078	-7.318	47	121	TRAP
A	N58º07.3851'	W007º19.3801'	58.123	-7.323	48	107	BRUV
A	N57º48.7446'	W007º12.0869'	57.812	-7.201	49	23	BRUV
A	N57º51.4321'	W007º12.4005'	57.857	-7.207	50	38	TRAP

A	N57º54.1195'	W007º12.7149'	57.902	-7.212	51	32	BRUV
A	N57º56.8068'	W007º13.0303'	57.947	-7.217	52	40	TRAP
A	N57º59.4941'	W007º13.3466'	57.992	-7.222	53	44	BRUV
A	N58º02.1814'	W007º13.6639'	58.036	-7.228	54	27	TRAP
A	N58º04.8687'	W007º13.9821'	58.081	-7.233	55	59	BRUV
A	N58º07.5559'	W007º14.3013'	58.126	-7.238	56	129	TRAP
A	N57º51.5978'	W007º07.3584'	57.860	-7.123	58	29	BRUV
A	N57º54.2855'	W007º07.6666'	57.905	-7.128	59	27	TRAP
A	N57º56.9731'	W007º07.9757'	57.950	-7.133	60	21	BRUV
A	N57º59.6607'	W007º08.2858'	57.994	-7.138	61	34	TRAP
A	N58º05.0358'	W007º08.9087'	58.084	-7.148	63	32	TRAP
A	N58º07.7233'	W007º09.2215'	58.129	-7.154	64	43	BRUV
A	N57º51.7601'	W007º02.3154'	57.863	-7.039	66	20	TRAP
A	N57º57.1360'	W007º02.9202'	57.952	-7.049	68	27	TRAP
A	N57º54.6074'	W006º57.5672'	57.910	-6.959	75	22	BRUV
B	N56º51.0932'	W007º40.0529'	56.852	-7.668	77	31	TRAP
B	N56º50.9080'	W007º44.9549'	56.848	-7.749	78	45	BRUV
B	N56º50.7196'	W007º49.8560'	56.845	-7.831	79	54	TRAP
B	N56º50.5280'	W007º54.7561'	56.842	-7.913	80	96	BRUV
B	N56º50.3332'	W007º59.6551'	56.839	-7.994	81	118	TRAP
B	N56º50.1351'	W008º04.5531'	56.836	-8.076	82	120	BRUV
B	N56º49.9339'	W008º09.4501'	56.832	-8.158	83	121	TRAP
B	N56º54.0228'	W007º35.6522'	56.900	-7.594	84	22	TRAP
B	N56º53.7794'	W007º40.3885'	56.896	-7.673	85	37	BRUV
B	N56º53.5938'	W007º45.2964'	56.893	-7.755	86	42	TRAP
B	N56º53.4051'	W007º50.2033'	56.890	-7.837	87	52	BRUV

B	N56º53.2132'	W007º55.1091'	56.887	-7.918	88	96	TRAP
B	N56º53.0180'	W008º00.0140'	56.884	-8.000	89	110	BRUV
B	N56º52.8197'	W008º04.9178'	56.880	-8.082	90	130	TRAP
B	N56º52.6181'	W008º09.8206'	56.877	-8.164	91	130	BRUV
B	N56º56.6481'	W007º35.8104'	56.944	-7.597	94	25	BRUV
B	N56º56.4655'	W007º40.7251'	56.941	-7.679	95	30	TRAP
B	N56º56.2796'	W007º45.6388'	56.938	-7.761	96	53	BRUV
B	N56º56.0906'	W007º50.5515'	56.935	-7.843	97	77	TRAP
B	N56º55.8983'	W007º55.4632'	56.932	-7.924	98	100	BRUV
B	N56º55.7028'	W008º00.3739'	56.928	-8.006	99	124	TRAP
B	N56º55.5041'	W008º05.2836'	56.925	-8.088	100	132	BRUV
B	N56º55.3023'	W008º10.1921'	56.922	-8.170	101	130	TRAP
B	N56º59.3345'	W007º36.1421'	56.989	-7.602	103	29	TRAP
B	N56º59.1516'	W007º41.0626'	56.986	-7.684	104	37	BRUV
B	N56º58.9654'	W007º45.9822'	56.983	-7.766	105	52	TRAP
B	N56º58.7760'	W007º50.9008'	56.980	-7.848	106	79	BRUV
B	N56º58.5834'	W007º55.8184'	56.976	-7.930	107	94	TRAP
B	N56º58.3876'	W008º00.7349'	56.973	-8.012	108	123	BRUV
B	N56º58.1886'	W008º05.6504'	56.970	-8.094	109	129	TRAP
B	N56º57.9863'	W008º10.5648'	56.966	-8.176	110	122	BRUV
B	N57º02.2009'	W007º31.5473'	57.037	-7.526	113	25	TRAP
B	N57º02.0208'	W007º36.4747'	57.034	-7.608	114	27	BRUV
B	N57º01.8376'	W007º41.4012'	57.031	-7.690	115	44	TRAP
B	N57º01.6511'	W007º46.3266'	57.028	-7.772	116	72	BRUV
B	N57º01.4614'	W007º51.2511'	57.024	-7.854	117	83	TRAP
B	N57º01.2685'	W007º56.1745'	57.021	-7.936	118	107	BRUV

B	N57º01.0723'	W008º01.0969'	57.018	-8.018	119	127	TRAP
B	N57º00.8730'	W008º06.0182'	57.015	-8.100	120	133	BRUV
B	N57º00.6704'	W008º10.9385'	57.011	-8.182	121	134	TRAP
B	N57º04.8875'	W007º31.8751'	57.081	-7.531	123	29	BRUV
B	N57º04.7071'	W007º36.8084'	57.078	-7.613	124	33	TRAP
B	N57º04.5236'	W007º41.7407'	57.075	-7.696	125	54	BRUV
B	N57º04.3368'	W007º46.6721'	57.072	-7.778	126	75	TRAP
B	N57º04.1467'	W007º51.6024'	57.069	-7.860	127	90	BRUV
B	N57º03.9535'	W007º56.5317'	57.066	-7.942	128	110	TRAP
B	N57º03.7570'	W008º01.4600'	57.063	-8.024	129	127	BRUV
B	N57º03.5573'	W008º06.3872'	57.059	-8.106	130	132	TRAP
B	N57º03.3544'	W008º11.3133'	57.056	-8.189	131	129	BRUV
B	N57º07.5740'	W007º32.2038'	57.126	-7.537	134	30	TRAP
B	N57º07.3934'	W007º37.1430'	57.123	-7.619	135	33	BRUV
B	N57º07.2095'	W007º42.0813'	57.120	-7.701	136	57	TRAP
B	N57º07.0224'	W007º47.0185'	57.117	-7.784	137	67	BRUV
B	N57º06.8320'	W007º51.9547'	57.114	-7.866	138	93	TRAP
B	N57º06.6385'	W007º56.8899'	57.111	-7.948	139	83	BRUV
B	N57º06.4416'	W008º01.8241'	57.107	-8.030	140	119	TRAP
B	N57º06.2416'	W008º06.7572'	57.104	-8.113	141	135	BRUV
B	N57º06.0383'	W008º11.6892'	57.101	-8.195	142	135	TRAP
B	N57º10.2606'	W007º32.5335'	57.171	-7.542	147	30	BRUV
B	N57º10.0796'	W007º37.4786'	57.168	-7.625	148	42	TRAP
B	N57º09.8954'	W007º42.4228'	57.165	-7.707	149	68	BRUV
B	N57º09.7080'	W007º47.3659'	57.162	-7.789	150	77	TRAP
B	N57º09.5173'	W007º52.3081'	57.159	-7.872	151	91	BRUV

B	N57º09.3234'	W007º57.2492'	57.155	-7.954	152	96	TRAP
B	N57º09.1262'	W008º02.1893'	57.152	-8.036	153	129	BRUV
B	N57º08.9258'	W008º07.1283'	57.149	-8.119	154	128	TRAP
B	N57º08.7222'	W008º12.0662'	57.145	-8.201	155	120	BRUV

Table 1: Coordinates of 1422A sampling stations.

Operations

Survey operations will take place between the hours of 07:00 and 19:00 (all times BST). Stations will be surveyed depending on the prevailing weather conditions i.e. if wind strengths or wave heights are adverse, a precautionary approach will be adopted and those with adequate shelter from the weather will be selected.

The vessel will leave the study area on the 5th October to allow sufficient time to travel to Oban. Unloading will occur in Oban on 6th October. Scientists will disembark at this time.

Normal contact will be maintained with the Laboratory.

Submitted:
T Regnier
01 September 2022

Approved:
I Gibb
15 September 2022