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MRV *Alba na Mara*

Survey 1021A

PROGRAMME

31 July – 18 August 2021

Loading: Fraserburgh, 27 July 2021
Unloading: Oban, 18 August 2021

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.

Out-turn days per project: 20232 - 19 days

Equipment

2x SBRUV
Modified Still Camera frame
2 x Day grab, grab table
2x Reverser bottles
Minilogger (or equivalent – i.e. DST). (x3)
eDNA Sampling kit

Note: It is important that the wet lab freezer is emptied for this survey as all the storage space will be required.

Background and Objectives

1021A will conduct a survey of elasmobranch and gadoid diversity and abundance at the mouth of sea lochs and inshore waters off the West coast of Scotland. The primary objective of 1021A is to assess the presence and diversity of elasmobranchs and gadoids in inshore waters within and beyond the limit of designated Marine Protected Areas (MPAs hereafter). 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 are deployed. Finally, habitat variables (depth, temperature, sediment type) will be collected to study the importance of these variables on fish diversity and abundance and to characterise the respective habitats. More widely, 1021A provides data to assess the status of threatened fish species (most elasmobranchs) in the region, gain understanding of the habitat requirements of various species (gadoids and elasmobranchs), assess the diversity of fish benefiting from the designated MPAs as well as their relevance to neighbouring fish aggregations, and help develop a non-invasive method (eDNA) to assess fish diversity and abundance, which is particularly relevant for endangered species or fish species characterised by a low catchability or occupying habitats inaccessible to traditional sampling methods.

Objectives

1. To determine the presence and abundance (Nmax) of elasmobranchs (including flapper skate) and juvenile gadoids in inshore waters and Sea Lochs off the West Coast of Scotland.

2. In a joint approach with NatureScot, generate data on flapper skate presence on likely routes to the egg laying site within the Red rocks and Longay MPA.

3. To record substrate features at the point of sampling.

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

Embarkation

Scientists will join the vessel one 31 July around 9:00, then weather permitting *Alba na Mara* will depart from Fraserburgh.

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 two distinct activities – baited camera work, and water/sediment sampling - which will be performed at each station.

1. Baited cameras

BRUVs will be deployed according to 2 different approaches:

A- Along predefined transects based on bathymetry, estimated substrate type and predicted habitat suitability for flapper skate (Figure 1, Table 1). 3 BRUVs will be deployed at 3 depths along the transects (Figure 2, high ≈150m, intermediate ≈ 75m, shallow ≈ 30m).

B- Within the Red rocks and Longay MPA, at sites determined in in collaboration with NatireScot and representing the likely routes used by adult flapper skates to access the egg laying sites (Figure 2).

BRUVs will be equipped with a surface buoy and deployed for 1.5h.

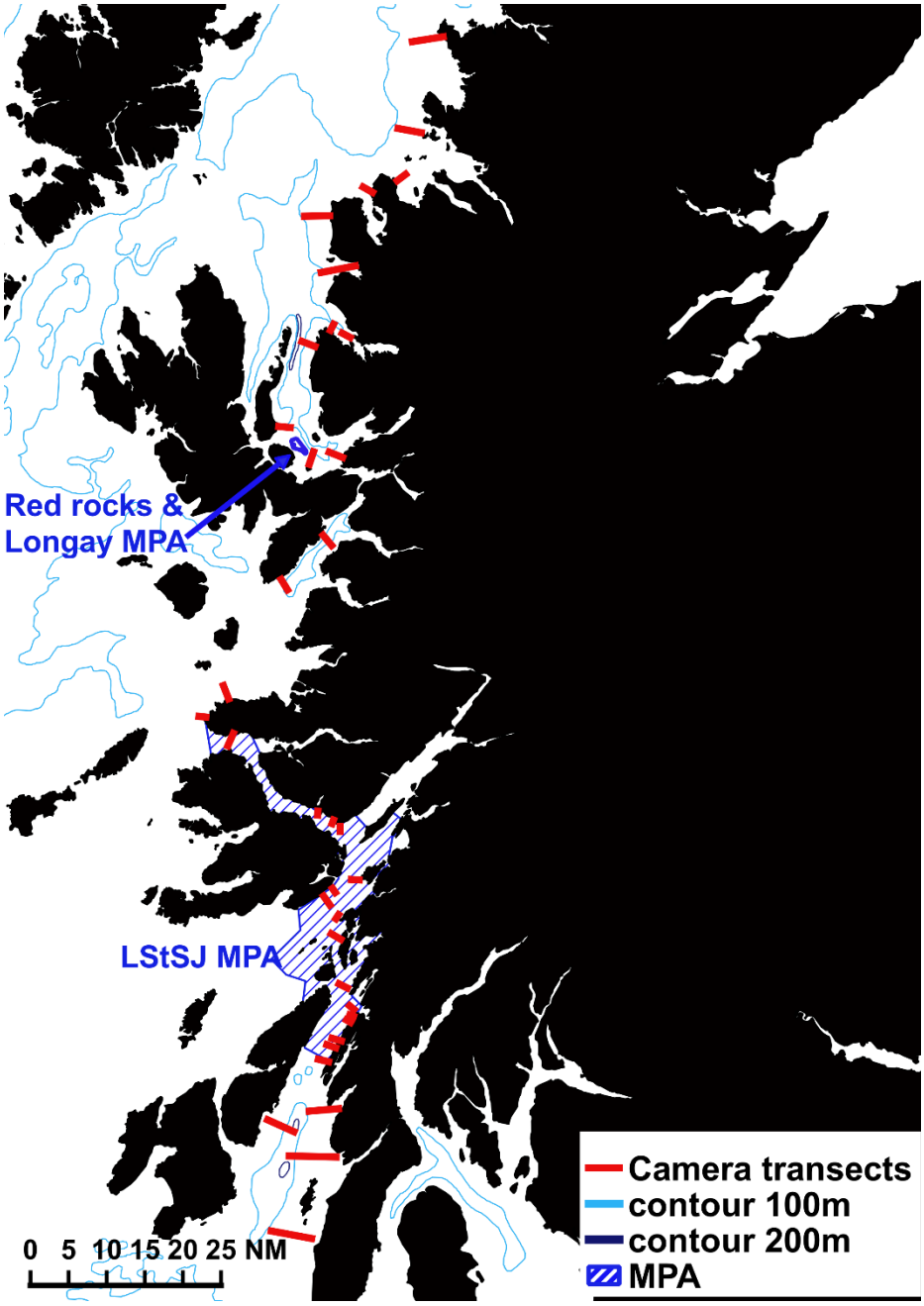

Figure 1: Map showing the predefined Camera transects in 1021A survey area.

Transect id	Lon start	Lat start	Lon stop	Lat stop
1	-5.884	55.612	-5.728	55.599
2	-5.827	55.777	-5.645	55.779
3	-5.812	55.831	-5.916	55.854
4	-5.756	55.877	-5.643	55.884
5	-5.729	55.990	-5.689	55.986
6	-5.698	56.023	-5.663	56.017
7	-5.679	56.037	-5.642	56.032
8	-5.625	56.078	-5.609	56.074
9	-5.613	56.089	-5.598	56.087
10	-5.598	56.102	-5.615	56.110
11	-5.660	56.156	-5.627	56.148
12	-5.698	56.265	-5.660	56.254
13	-5.682	56.298	-5.672	56.307
14	-5.707	56.327	-5.733	56.346
15	-5.688	56.355	-5.700	56.364
16	-5.627	56.385	-5.596	56.385
17	-5.679	56.488	-5.679	56.499
18	-5.711	56.505	-5.707	56.513
19	-5.770	56.522	-5.769	56.531
20	-6.136	56.665	-6.117	56.692
21	-6.256	56.726	-6.229	56.725
22	-6.165	56.795	-6.142	56.767
23	-5.927	57.010	-5.953	57.032
24	-5.757	57.111	-5.793	57.132
25	-5.782	57.314	-5.728	57.304
26	-5.846	57.313	-5.861	57.286
27	-5.943	57.364	-5.990	57.365
28	-5.749	57.574	-5.716	57.566
29	-5.786	57.593	-5.797	57.580
30	-5.845	57.705	-5.707	57.722
31	-5.923	57.826	-5.821	57.829
32	-5.688	57.894	-5.649	57.884
33	-5.516	57.926	-5.549	57.911
34	-5.911	57.553	-5.858	57.543
35	-5.508	58.215	-5.382	58.228
36	-5.554	58.025	-5.458	58.018

Table 1: coordinates of Camera transects.

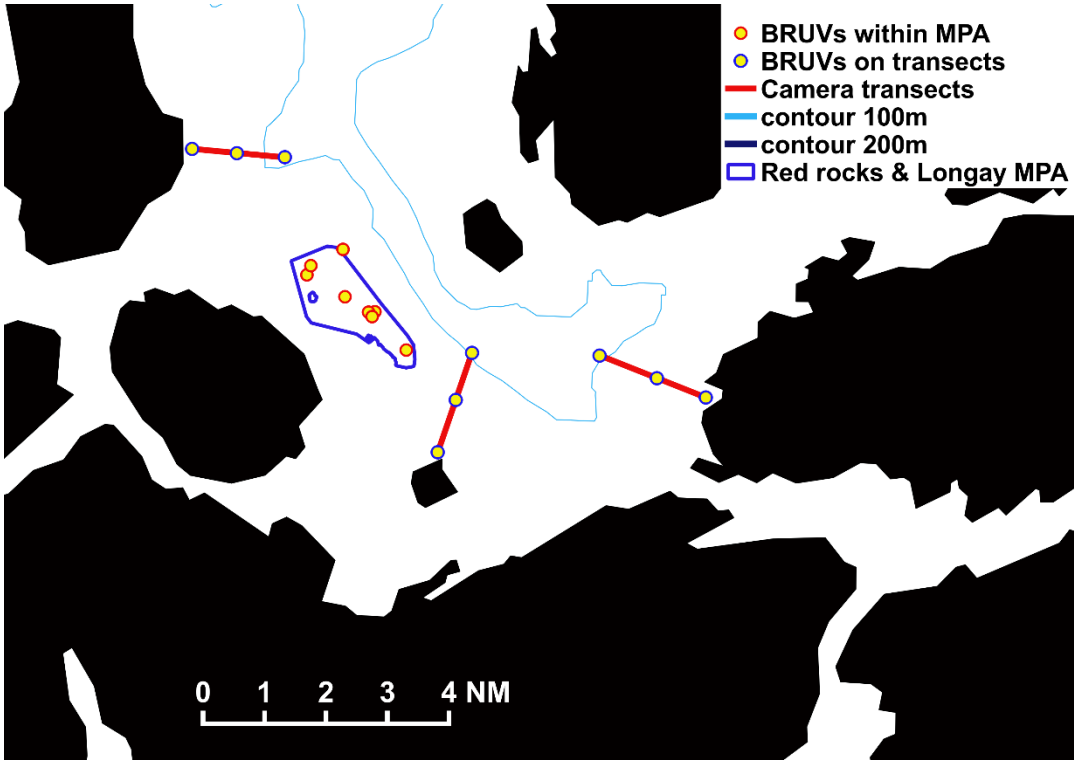

Figure 2: Map showing a) the approximate location of BRUVs deployed along the transects Camera transects in 1021A, and b) the location of the BRUV deployments targeting adult routes within the Red rocks and Longay MPA.

Id	Lat	Long	Depth
1	57.33241	-5.92968	45m
2	57.33496	-5.92792	45m
3	57.33973	-5.9122	65m
4	57.3232	-5.89491	50m
5	57.32301	-5.89807	27m
6	57.31318	-5.87843	27m
7	57.32185	-5.89619	43m
8	57.32692	-5.91019	76m

Table 2: Coordinates of the BRUV deployments within the Red rocks and Longay MPA.

2. Substrate classification

To further aid the classification of the substrate at each sampling site, 1021A will acquire RoxAnn records of the surveyed area and a Day grab will be deployed (except in the Red rocks and Longay MPA). Sediment samples will be collected from each grab and stored in the freezer. A visual assessment of substrate type will be done at each station and sediment will be kept for eDNA analyses. Once video footages from the BRUVs are analysed, a visual classification of the substrate will be established from the video as well.

3. eDNA samples

Sediment and 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 all sampling sites indicated on the map (Figure 1). Sediment

samples will be collected using day grab and subsamples with be taken using sterile 50 ml falcon tubes. Water samples will be collected using reverser bottles within 5m and at 10m from the seabed. Collected water will be filtered through 0.8 micron filters using sterile 50ml syringe. Sediment and filter samples will be stored at -20°C.

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 17th August to allow sufficient time to travel to Oban. Unloading will occur on Wednesday 18 August. Scientists will disembark at this time.

Normal contact will be maintained with the Laboratory.

Submitted:
T Regnier
23 July 2021

Approved:
I Gibb
30 July 2021