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MRV *Alba na Mara*

Survey 2316A

PROGRAMME

8-21 December 2016

Loading: Leith, 6 December 2016
Unloading: Fraserburgh, 21 December 2016

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.

Personnel

J Clarke (SIC)
M Gault
T Regnier
N Collie

Out-turn days per project: 20393 - 14 days

Equipment

Sandeel dredge × 2 (modified 4' scallop dredge with 6" teeth and spare toothbars) with towing bar and camera attachment.
TV camera.
Minilogger (or equivalent – i.e. DST).

Objectives

1. To determine the abundance, length and age of sandeels in the sediment from regions east of the Firth of Forth and around Turbot bank.

2. To collect and preserve samples of *A. marinus*, specifically i) all 0-group sandeels (size to be estimated from age/length keys of sampled catches) not required for age determination; ii) 100 age-1 individuals from each of the northerly and southerly sub-regions.

3. To determine the sex and maturity stage of all sandeels selected for ageing.

4. To collect caudal fin tissue clips from sandeels selected for ageing –individuals of age 1+ should be targeted to maximise the likelihood fish are local. 70 samples will be taken from each sub-region (north and south; 140 in total).

Procedure

All required gear will be loaded onto the vessel on 6 December. Scientific staff will be transported to Leith to join the vessel on 8 December.

Two regions of historical importance for sandeel fishing will be surveyed (see Figure 1). In the first half of the survey a series of eight dredge stations to the east of the Firth of Forth will be sampled following the protocol established in 1999. A modified scallop dredge will be used to catch sandeels buried in the substrate at the priority stations given in Table 1 and Figure 2. Further stations in this region will be sampled if time permits. In the second half of the survey, the dredge will be deployed at stations 20-36 in the Turbot bank region (Table 1, Figure 2). Ideally five repeat tows will be conducted at each station although this may be reduced to a minimum of two, if catch quantities are low or available time is limited. Dredge duration will be approximately ten minutes at a towing speed between two and three (ideally 2.5) knots.

At each dredge station, all sandeels will be identified to species level, measured, and otoliths (5, 8 or 10 depending on length strata, per half centimetre) will be taken for age determination (objective 1).

All 0-group sandeels will be retained and frozen individually for later analysis. Sub-samples of 100 age-1 (size to be determined from age-length keys of sampled catches) *A. marinus* will be taken from the northerly (latitude > 57°N) and southerly (latitude < 57°N) sub-regions (objective 2).

Sandeels selected for ageing will be dissected and macroscopically assigned a maturity stage based on a simple three-point scale (I = immature/indeterminate sex; M= mature male; F = mature female) (objective 3).

In addition, 70 fin tissue samples will be taken from dissected fish at stations within both northerly and southerly sub-regions, for the purpose of DNA extraction. Standard operating protocols will ensure field techniques are sterile and cross-contamination between samples is avoided. Each Individual caudal fin clip will be immersed in 96% ethanol and stored at the appropriate temperature (objective 4).

Following the completion of survey work, *Alba na Mara* will return to Fraserburgh for unloading.

Normal contacts will be maintained with the laboratory.

Submitted:
J Clarke
23 November 2016

Approved:
I Gibb
25 November 2016

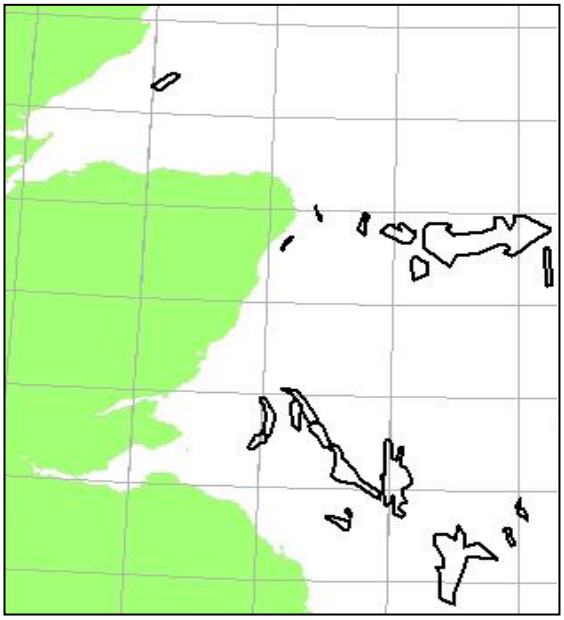

Figure 1: Location of important.

Station	Latitude	Longitude	Depth (m)
1	56°05.880' N	01°20.460' W	46
2	56°07.380' N	01°23.280' W	51
3	56°13.560' N	02°03.240' W	37
4	56°14.580' N	02°02.340' W	41
7	56°24.840' N	02°25.980' W	29
8	56°25.080' N	01°58.800' W	44
9	56°28.020' N	01°43.920' W	49
10	56°21.840' N	01°41.760' W	42
12	56°14.940' N	01°58.620' W	44
17	56°03.900' N	01°19.620' W	45
18	55°47.700' N	01°19.680' W	54
19	56°39.960' N	01°48.300' W	60
20	57°19.200' N	01°06.420' W	
21	57°42.780' N	01°13.080' W	
22	57°44.400' N	01°25.620' W	
23	57°46.500' N	01°28.980' W	
24	57°23.940' N	00°42.300' W	
26	57°23.460' N	01°47.340' W	
27	57°42.720' N	01°35.400' W	
28	57°41.100' N	01°35.040' W	
29	57°43.200' N	02°12.960' W	
30	57°22.140' N	00°41.580' W	
31	57°24.300' N	00°48.600' W	
32	57°22.080' N	00°50.280' W	
33	57°21.900' N	00°57.060' W	
34	57°25.020' N	00°53.340' W	
35	57°25.560' N	01°06.960' W	
36	57°24.000' N	01°02.520' W	

Table 1: Location of dredge stations. Priority stations (1-10) are highlighted.

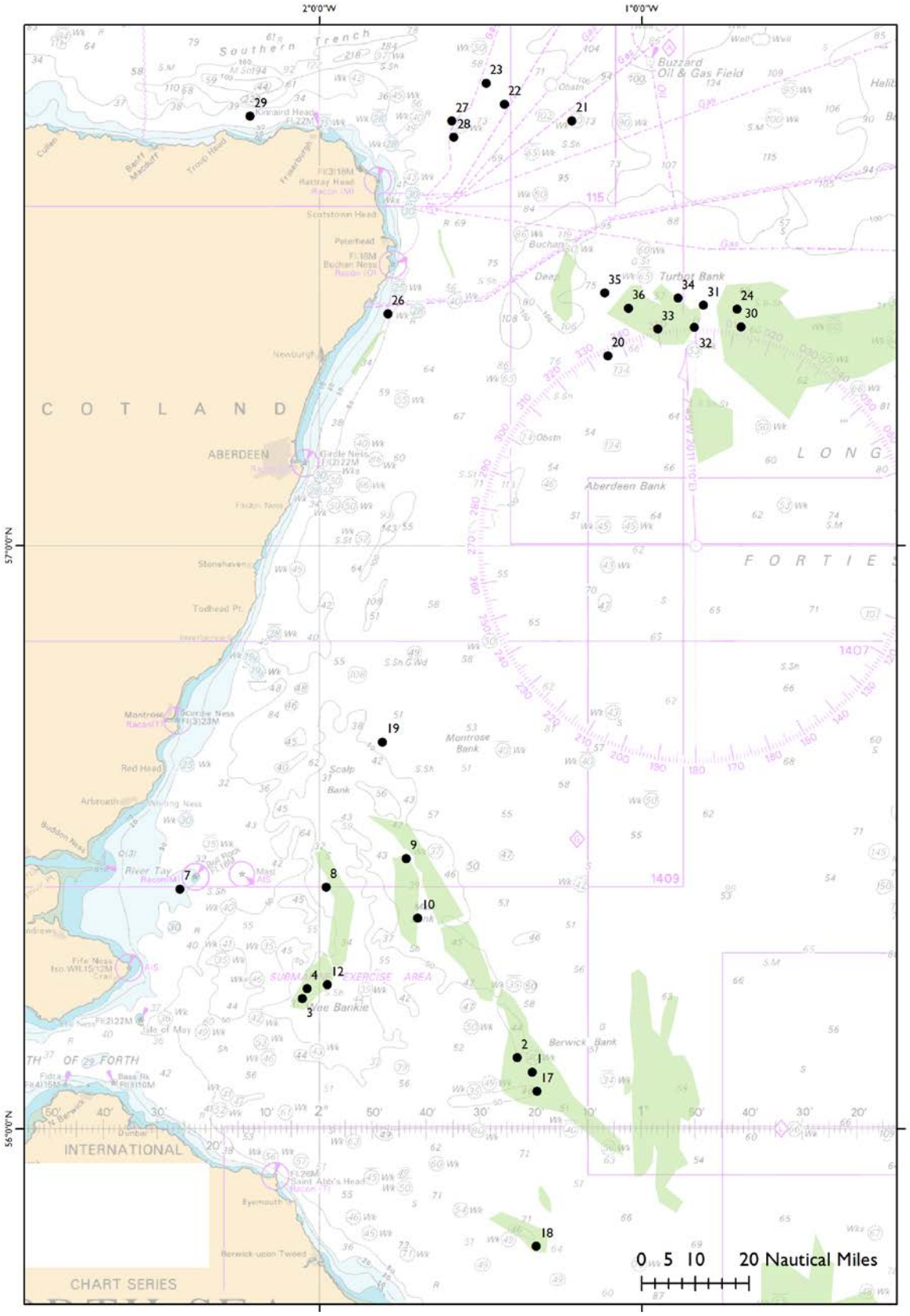

Figure 2: Chart of dredge stations to be sampled in 2316A. Areas historically fished for sandeel are shown in green.