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FRV *Alba na Mara*

Cruise 0909A

REPORT

4 - 17 June 2009

Personnel

SPR Greenstreet	(SIC)
HM Drewery	
E Guirey	
C Greathead	
L Morley	(4 - 11 June)
F Armstrong	(11 -17 June)

Out-turn days per project: AE11D 14 days.

Cruise Objectives

The primary objective of this “ecosystem monitoring” cruise was to determine the abundance of sandeels and other potential pelagic fish prey on and around the main sandbanks (the Wee Bankie, Marr Bank and Berwick’s Bank) within the northwestern North Sea sandeel closure area. The study area is close to major seabird colonies situated at the mouth of the Firth of Forth and along the coasts both to the south and to the north. Fishing has in the past had a major impact on the availability of sandeel prey to breeding seabirds utilising this area as feeding grounds, but closing the area to fishing neutralised the impact of fishing on seabird prey resources. More recently the breeding performance of many seabirds in the area has again declined and there is growing concern that environmental changes associated with warming sea temperatures may be affecting the availability of prey to marine top predators in the region. An absolute sandeel abundance index is derived through combination of a demersal trawl survey index of sandeel abundance in the seabed sediments and an estimate of the abundance of sandeels in the water column determined by acoustic survey. Two separate indices of the abundance of sprats and herring are also obtained from each of these survey methods. In addition, the demersal trawl survey provides an index of the abundance of piscivorous fish predators in the study area. A census of seabirds and marine mammals in the area was carried out simultaneously with the acoustic survey to assess the abundance of these predators in the area as well. To determine the influence of hydrographic conditions on prey availability, particularly to seabird predators, CTD data were collected whilst the demersal trawl survey was carried out.

The cruise therefore had the following objectives:

1. To carry out an acoustic survey to determine an abundance estimate for sandeels in the in the water column. Three frequencies, 38, 120, and 200 kHz were used to aid species recognition. This acoustic survey also produced herring and sprat abundance estimates. Concentrations of fish were sampled using the pelagic trawl to determine species composition and length frequency distributions. Sub samples of the fish caught were weighed and had otoliths removed to establish length-weight relationships and age composition.

2. To carry out a demersal trawl survey to determine an abundance index for sandeels in the seabed sediment. This demersal trawl survey also produced abundance indices for herring and sprats, the two other main “prey” species, as well as abundance indices for the major piscivorous fish predators in the area, whiting, haddock and cod. At each trawl station the length frequency of all fish species caught was determined. Sub-samples of sandeels, herring, sprats, cod, haddock, and whiting were weighed to determine length-weight relationships. Otoliths were removed from sandeels and clupeids to determine age composition. Sub-samples of the gadoid predators were retained and frozen for subsequent dietary and age composition analysis if required.
3. Simultaneously with the demersal trawl survey, to carry out hydrographic survey using a Seabird 19 CTD sampler fitted with a fluorometer to determine spatial variation in water temperature, salinity and fluorescence across the study area.
4. Simultaneously with the acoustic survey, to survey seabirds at sea within the study area using standard census methods. Protection of local breeding seabirds was one of the principal motives underpinning the sandeel fishery closure.
5. Whilst carrying out seabird at sea survey, to record all sightings of marine mammals (number of animals, species if possible, and their location).

Narrative

Scientific equipment was loaded on board *Alba na Mara* on 1 June. S Greenstreet, H Drewery, E Guirey, C Greathead and L Morley joined *Alba na Mara* at Fraserburgh at 1000h BST on the morning of 4 June. The vessel sailed at 1100h to make passage to the first demersal fishing station where she lay hove to for the night. Demersal trawling and CTD sampling commenced the following morning in the most northeasterly corner of the study area. However, after the first two demersal stations were sampled, problems with the main winches necessitated a call into Montrose for repairs. *Alba na Mara* sailed early the next morning to continue demersal trawl and hydrographic sampling work. This was completed over the next three days with 19 demersal trawl stations (figure 1A) and 42 hydrographic stations (Figure 1B) sampled. During this work *Alba na Mara* lay hove to for one night over the Berwick’s Bank (on Sunday 7 June) and anchored off the Isle of May for the remaining nights. Catches of all species in each sample were quantified to determine abundance at length. For the most common demersal species, data were collected to determine weight-at-length relationships and to examine the relationship between predator size and prey size. Otoliths were collected from sandeels herring and sprats to determine age-at-length keys. Samples of cod, haddock and whiting were retained for dietary analysis in the laboratory.

On completion of the demersal trawling and hydrographic work, *Alba na Mara* sailed for Montrose for the gear and staff change-over, arriving at 1400 on Wednesday 10 June. On Thursday 11 June, the demersal BT158 fishing gear was exchanged for the pelagic PT154 fishing gear. L Morley left the vessel and E Armstrong joined. *Alba na Mara* sailed at 1430 on Thursday 11 June to commence acoustic and seabird survey work, anchoring for the night off Fifeness.

Acoustic and seabird survey commenced at 0430 of the morning of 12 June (Figure 1C). The vessel lay hove to on the southern tip of the Marr Bank for the night of 12 June, allowing the most eastern ends of the four southern transects to be covered (Figure 1C). The four southern most transects (Figure 1C) were completed over three days with the vessel anchoring off the Isle of May for the night of 13 June and off Fifeness for the night of the 14 June. The final two most northerly transects were covered on 15 June. Sandeel marks (believed to be primarily 0-group fish) were widely distributed and two particular

concentrations were successfully sampled. Length frequency distributions were determined, and samples collected for otolith age analysis and to determine weight-at-length relationships. An attempt to sample a concentration of marks believed to consist of herring and sprats was unsuccessful. *Alba na Mara* anchored off Montrose Bay for the night of 15 June and sailed for Fraserburgh on 16 June arriving at 1400. Sightings of marine mammals were sparse despite the generally excellent survey conditions (Figure 1D).

Scientific equipment was offloaded on the morning of 17 June and Scientists left the vessel by 1130.

S Greenstreet
23 June 2009.

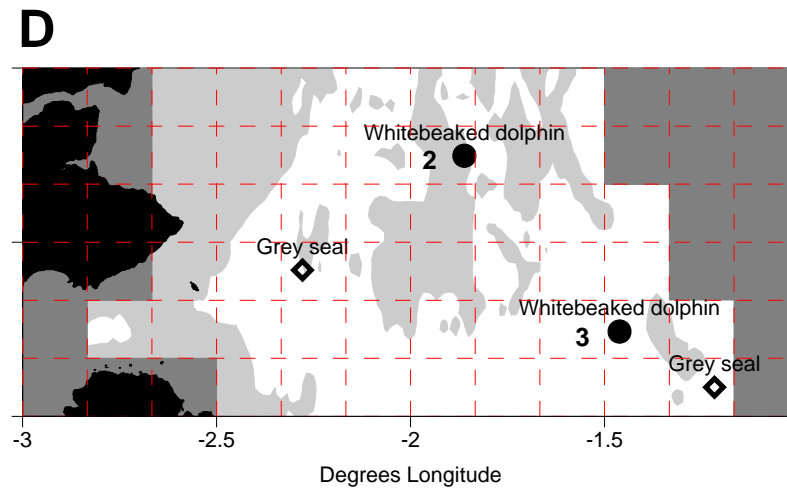
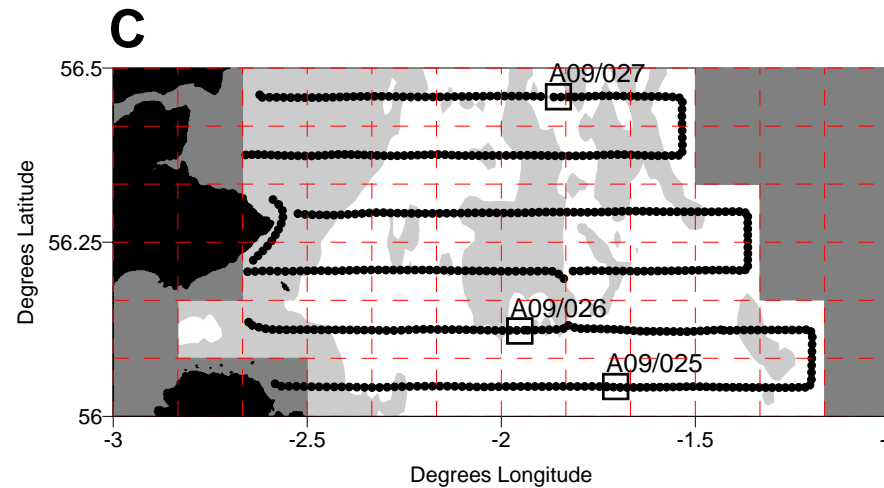
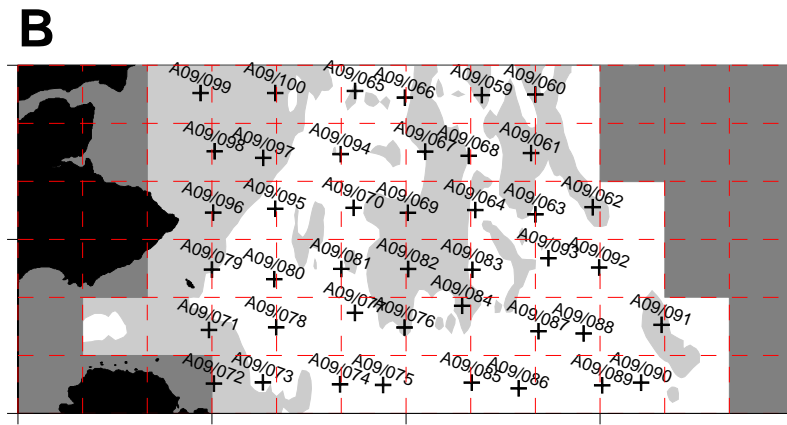
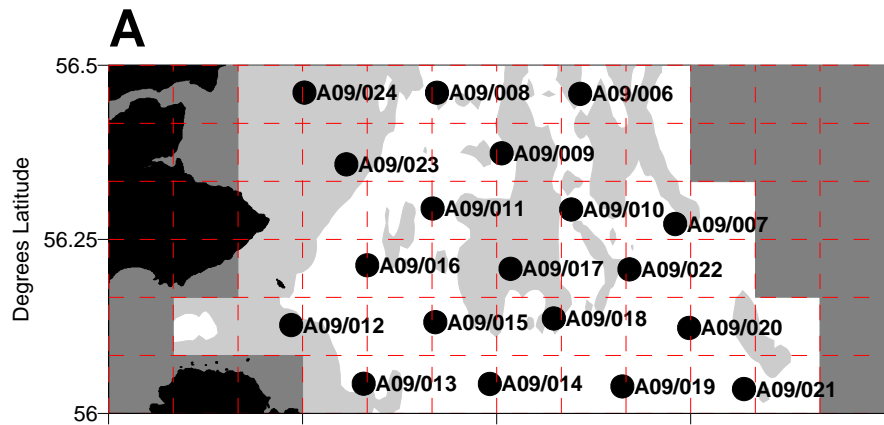


Figure 1. A. Demersal trawl survey stations fished. B. Hydrographic stations sampled by CTD. C. Centre points of acoustic and seabird at sea survey five-minute integration periods (circles) and location of pelagic trawl samples (squares). D. Number and location of marine mammals sighted.