

**MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK NR33 0HT**

1996 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 13

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DURATION: 11-18 October 1996

LOCALITY: North Sea (English east coast)

AIMS:

1. To use side-scan sonar and RoxAnn to identify variation in seabed in the Bridlington Bay and Holderness coast fishing grounds, and relate this variation to known localised levels of exploitation and the abundance and size distribution of the lobster and crab catch.
2. To 'ground truth' the area using a towed sledge with underwater TV camera, and with stills photography.
3. To collect sediment samples using a Day grab to establish the type of substrate in each sub-area.
4. To repeat 1-3 above (if time permits) on Race Bank where there is an extensive crab fishery and where ovigerous female crabs are thought to be present.

NARRATIVE:

RV Corystes sailed from Lowestoft at 0800 on Friday 11 October, and steamed to the south-east corner of Race Bank. The side-scan sonar was towed at 6 knots along a transect in a north-westerly direction for 17 km. RoxAnn was running in the background for the duration of the side-scan survey.

The aim of this initial survey line was to familiarise scientists with the use of the equipment, and to gain experience in interpreting side-scan traces prior to the main survey work off the Holderness coast. During this first transect line some static gear

was encountered indicating crab fishing grounds. The transect was then retraced to take samples with the Day grab and to deploy the dunking camera at three sites along the transect. The sediment samples collected by the Day grab were photographed and a sub-sample retained for particle size analysis.

On completion of this sampling RV Corystes sailed for the Holderness coast. Overnight on 11/12 October, an intensive RoxAnn grid of 20 strips of 100m was surveyed, thus covering a 2 km. square. Sextant was used to generate the grid which was centred on known good lobster grounds approximately 6 miles from Bridlington. The grid took 5 hours to complete, and provided guidance on whether the area was sufficiently heterogeneous to warrant detailed investigation by side-scan survey and ground-truthing by underwater television (UWTV) camera deployment.

On 12 October RV Corystes conducted a side-scan survey along the north side of Flamborough Head, and then south down through Bridlington Bay approximately six miles offshore and parallel to the coast finishing just north of Spurn Point. For this and all later side-scan transects, RoxAnn was running in the background. The transect was then re-traced to take Day grab samples and deploy UWTV camera at four stations along the transect. The sector scanner was also employed during the deployment of the UWTV camera at these and all following stations.

Overnight on 12/13 October, two intensive RoxAnn grids were carried out at points along the above side-scan transect, one off Mappleton and one off Grimston. This was carried out using the same procedures as the previous night.

On 13 October RV Corystes carried out a north-south side-scan transect from Withernsea to Skipsea through the inshore fishing grounds approximately 2 miles from the coast. During this transect, a high density of static gear was encountered at many points, particularly at the northern most end of the transect. The transect was retraced to take grab samples and deploy the UWTV camera at three sites.

Two further north-south transects were then conducted at the inner and outer edges of the Cowden bombing range, which is known as particularly good small lobster ground. Two stations were surveyed by UWTV cameras on the inner transect, but no time was available to complete UWTV camera stations on the outer transect.

Overnight on 13/14 October, a rough RoxAnn grid was completed covering the fishing grounds further offshore. Five mile transects were run approximately 4-9 miles off perpendicular to the coast line from Withernsea to Skipsea. The strips on this RoxAnn grid were 2 miles apart seeking to build up a general picture of the nature of the seabed offshore from the traditional inshore fishery.

On 14 October 1996 RV Corystes took grab samples and UWTV camera shots around the South Smithic area in an attempt to delineate the area of sandy bottom in the locality. Corystes then steamed to the north of Flamborough Head and took grab samples and deployed the UWTV camera station at selected points on the side-scan transect carried out through this area on 12 October. The channel between Flamborough Head and South Smithic was then surveyed using UWTV camera and sector scanner. A 17 km. east-west side-scan transect was then conducted just south of

Skipsea, as many of the features picked up on the north-south transect had been running in a north-south direction. This east-west transect passed through a high density of dhans for the first mile inshore, but then passed through clear areas except for a small area approximately 6-7 miles off, where once again static gear was encountered. The transect was then re-traced to carry out UWTV camera work.

Overnight on 14/15 October a second rough RoxAnn grid of 5 mile tows in an east-west direction each 2 miles apart was undertaken, and this time the grid was run outside the grid run the previous night (i.e. from 9-14 miles offshore).

On 15 October RV Corystes conducted a further east-west side-scan transect for 17 km through the Cowden bombing range, and the transect was retraced to deploy the UWTV camera shots at 4 stations. The final two camera stations at the outer edge of the bombing range, which were left over from the survey on 13 October, were then surveyed.

Later that day an intensive side-scan survey of a 2km square box was carried out off Hornsea. The area was covered by 10 strips of 200m width. Once again the inshore area of this transect was heavily fished with static gear. Three UWTV camera shots were deployed along this transect.

Overnight on 15/16 October a further rough RoxAnn grid of 5 mile east-west transects approximately 2 miles apart was carried out from the northern edge of the grids previously surveyed and northwards to Filey Bay.

On Wednesday 16 October RV Corystes conducted a side-scan transect along the channel between Flamborough Head and South Smithic down to the rough grounds of Skipsea. Two further short east-west side scans at Hornsea and Mappleton were also run. Camera stations on the two east-west side scans which were completed in the morning and the remaining camera dips on the Skipsea east-west side scan transect were carried out later that day.

Overnight an intensive RoxAnn survey was carried out off Hornsea covering 4 km square in 20 strips of 200m. The aim of this was to identify a piece of ground which was particularly heterogeneous in nature to allow quantitative estimation of the ground in each survey area.

On Thursday 17 October RV Corystes carried out stills photography at four stations to provide archive shots of sand, gravel, stones and reef structures to ground truth the side-scan shots. Underwater TV ran simultaneously during the taking of these stills photographs.

An intensive side-scan survey of 2 km square box approximately 6 miles south east of Bridlington which had been previously surveyed in an overnight survey by RoxAnn was then undertaken. Three sites representing gravel ribbons, reef and sand were surveyed with UWTV camera and stills photography.

A second intensive side-scan survey was then carried out off Hornsea in an area identified from and encompassed by the RoxAnn grid carried out the previous night. One site where reef bordered onto a sand area was surveyed by UWTV camera.

Overnight on 17/18 October a rough RoxAnn survey of three 10 mile east-west transects each 2 miles apart were carried out from Withernsea down to Spurn Point area. These transects are continuous with those carried out on 13, 14 and 15 October, completing our rough grid of the main offshore fishing areas.

This RoxAnn grid was completed by 0300, and then RV Corystes steamed for Lowestoft.

The morning of 18 October was spent steaming for Lowestoft, with RV Corystes coming alongside the quay at 1330.

RESULTS

1. Race Bank

Grab samples taken along the side scan line showed that the ground was mostly coarse sand and broken shell with some mud and shingle. Numerous *Cancer pagurus* were observed on one of the stations with the underwater television (UWTV). In this area it appeared relatively easy to interpret the side-scan traces in relation to actual observations of the sea bed.

2. Bridlington Bay / Holderness coast

General

The area of Bridlington Bay and the Holderness coast proved to be a particularly complex area consisting of a mosaic of sand, gravel, stones, shingle and reefs. This varied habitat may account for the high productivity of lobsters in the area.

A significant amount of static gear was encountered primarily in the inshore area, which helped, along with historical records of fishing positions, to identify possible reef areas, but which made the work towing the side-scan and the use of the dunking camera particularly difficult at times.

RoxAnn surveys

The rough RoxAnn grids carried out overnight provided a good indication of the extent of the main fishing grounds in the area, at low cost utilising the 24 hour capability of the ship. The surveys helped to delineate the offshore grounds (Fig. 1), and to provide guidance on the degree of heterogeneity in a specified area.

Side scan surveys

The side scan sonar was used to delineate areas of ground on a series of north-south and east-west transects, and to provide intensive images of small delineated 2 km square boxes (Fig. 2). It is hoped that these intensive images will be capable of being analysed to provide quantification of each type of substrate within the delineated area.

Underwater Television and scanning sonar

The dunking camera was deployed at 40 stations (Fig. 3) and proved to be extremely successful in obtaining clear images in all depths of water. Drifting in the tide permitted an estimate of distance run, with a possibility therefore of quantifying extent of different substrates. In extremely strong tides and in areas with large isolated rocks, there was concern that the camera might be damaged on the sea bed and it was necessary to deploy the bow thrusters to slow the speed of drift of the vessel. After a number of days experience it proved possible to identify the nature of the substrate from the side-scan sonar images only, although it is still wise to confirm the interpretation with another means such as UWTV. The sector scanner also provided comparative images of a circle of 100m around the camera.

A surprisingly large number of crabs were observed in the area, particularly on a patch of mussels in the channel between Flamborough Head and South Smithic. We also observed a number of lobsters on UWTV, at all times of the day and tidal state, and one was seen one out of its burrow in a 3 knot tide.

Stills photography

The stills camera was successfully deployed on the day of calmest sea conditions. At a series of stations, photographs were taken to provide an archive of material of ground types for comparison with future work.

Sledge camera

The UWTV mounted on the towed sledge was not required on the cruise due to the success of the dunking camera and because of the likely problems of towing the sledge over the types of ground encountered.

Day Grabs

Day grabs worked successfully in sand and gravel substrates but were not deployed in reef areas. Photographs of the sample were taken at each grab station and a sub-sample retained for particle size analysis.

Data analysis

During the cruise the data collected from all sources was collated and prepared for entry into MapInfo, a geographical information package. Fishery information on the lobster and crab fishing positions in the locality will also be included, in order to

delineate the extent of the fishery and to quantify the extent of various types of substrate in relation to fishing intensity.

Acknowledgements

It is a pleasure to acknowledge the professionalism of the officers and crew of RV *Corystes*, whose support and flexibility throughout the cruise contributed greatly to the success of the programme.

J. T. Addison
18 October 1996

SEEN IN DRAFT: A. R. Williams, Master
R. Graham, SFM

INITIALLED:

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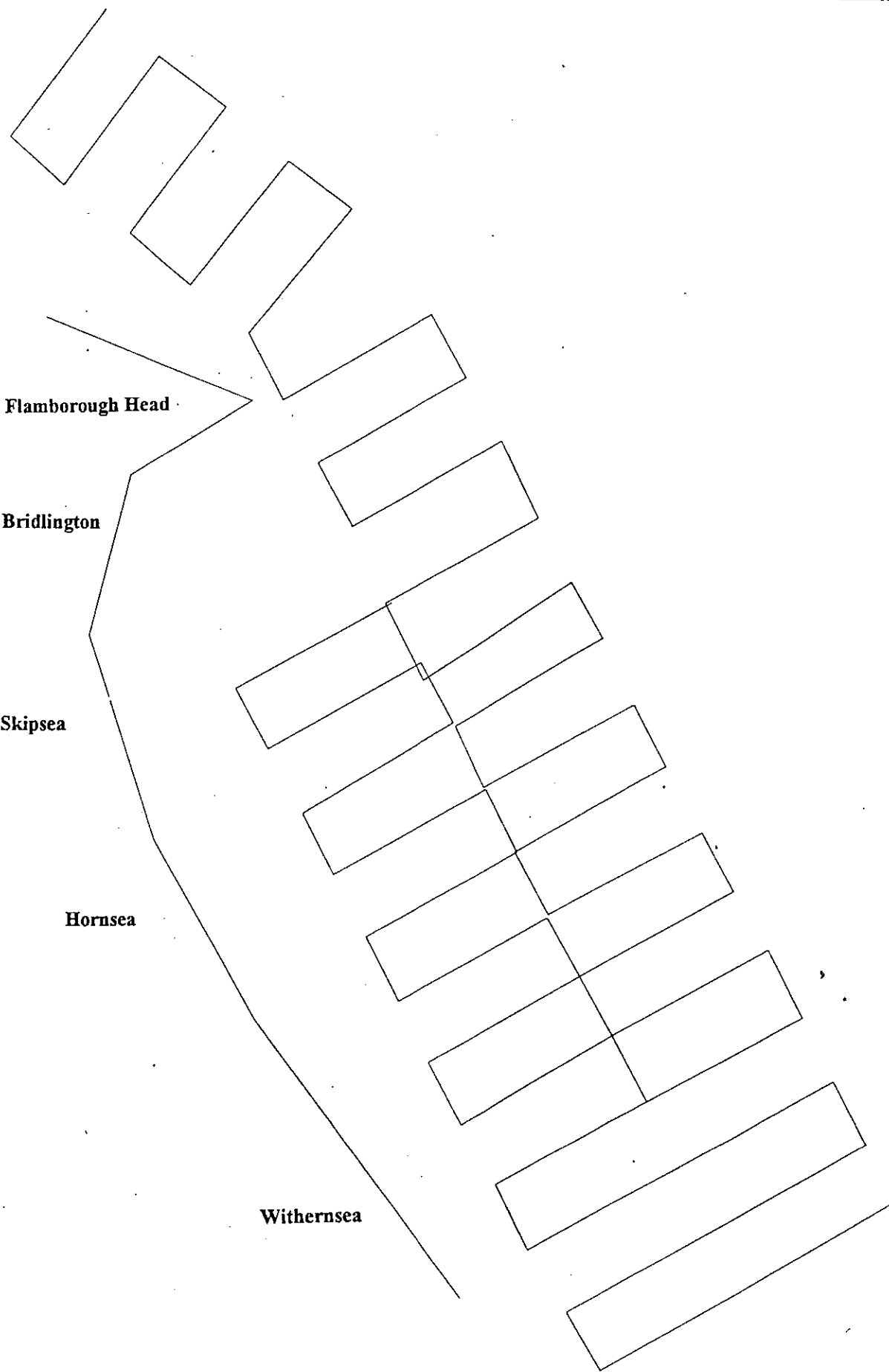


Figure 1

Corystes 13 96 RoxAnn grid
Scale: 300000
Date: 18-Oct-96

Figure 2 Corystes 13/96 Side scan grid

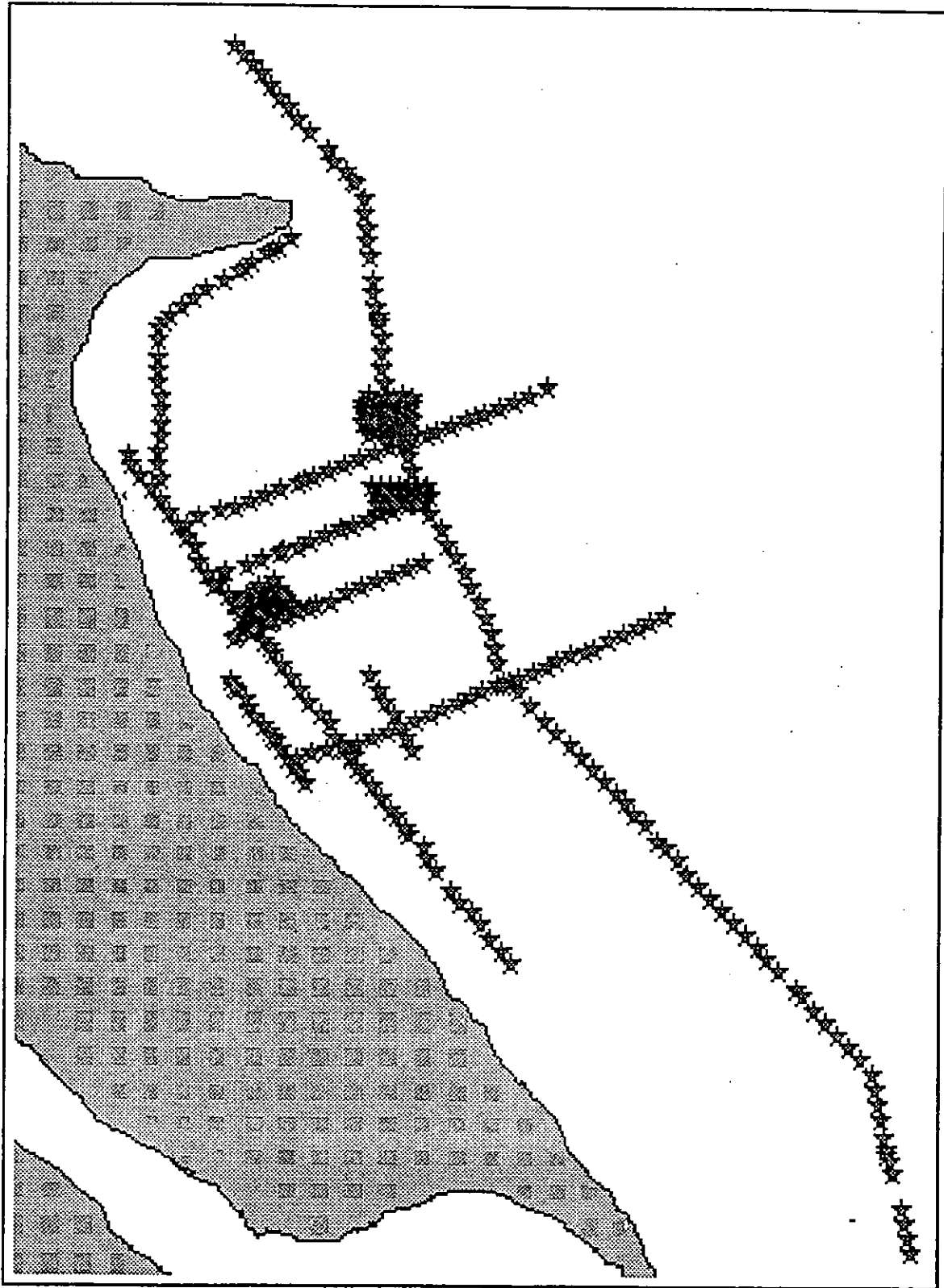


Figure 3 *Corystes* 13/96 Camera stations

