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

1993 RESEARCH VESSEL PROGRAMME

REPORT: RV CIROLANA: CRUISE 7A

(PROVISIONAL: Not to be quoted without prior reference to the author)

STAFF:

D B Bennett (SIC)
B M Thompson
A R Lawler
P R King
G M Layzell
M W Etherton

DURATION: Left Lowestoft 1218 h GMT 8 July 1993
Arrived Lowestoft 1236 h GMT 25 July 1993
All times are GMT

LOCALITY:

North Sea

AIMS:

1. To carry out a plankton survey using a 53cm high speed tow net fitted with the Guildline CTD monitoring system, to determine the distribution and abundance of crab (Cancer pagurus) larvae in relation to fishing grounds and sea bed sediments, Figure 1.

2. To study the vertical distribution of crab larvae.

3. To continuously monitor the chlorophyll "a" fluorescence, temperature, and salinity of sub-surface sea water.

4. To take discrete sub-surface sea water samples for salinity determination at each plankton station and throughout the working area.

NARRATIVE

RV CIROLANA sailed from Lowestoft at 1218 h 8 July and made for the first station of the main crab larvae sampling grid (Figure 1). Deployment of the high speed tow net with CTD monitoring package started at 1515 h. After two stations with CTD readouts fluctuating considerably the CTD was changed and subsequent outputs were much improved, requiring minimal editing of data files. The continuous environmental monitoring package was started up at 1245 h on 9 July, and discrete samples of seawater taken to provide salinity calibration of the CTDs. Sampling for crab larvae continued on the main grid until Station 24 at 0449 h on 10 July.

A mini-grid of 6 stations was then commenced over the proposed NRA aggregate extraction site on the Race Bank off North Norfolk (Figure 2). With the intention of resuming the main grid RV CIROLANA steamed towards the next station until a gyro compass failure forced a return to anchor off Lowestoft at 1736 h 10 July to await an engineer.

Following the repair of the gyro RV CIROLANA left Corton Roads at 1200 h 11 July to make for the nearest station of the main grid. Sampling continued until station 52 at 1703 h 12 July. The straight-line track was then amended to ensure that stations 63-72 were done in daylight to avoid damaging dahns and buffs on fixed fishing gear. Information on the positions of crab and whelk pots had been obtained via the Grimsby DI's office and fishermens' organisations. Following damage to the winch cable at station 88, when the wire jumped out of the block, the second winch and cable were put into use.

The straight-line track was recommenced and sampling continued until station 97 at 2330 h 14 July. RV CIROLANA then headed North up the English coast working inshore stations. This strategy ensured that the main grid would be completed close to the start of the secondary grids and minimised steaming distances. Following the loss of a day due to the gyro failure, 16 stations on the NE corner of the planned main grid were abandoned to ensure sufficient time would be available to complete the secondary grids.

For the next 4½ days sampling continued successfully on the main sampling grid, which was completed at 0423 h 22 July.

A secondary infill grid (Figure 2) was then begun over the area where the new offshore crab fisheries have developed, and where there has been increased interest in aggregate extraction (53° to 54°N, 2°E westwards to the English coast). Stations were positioned between those already sampled in the main grid to provide increased sample density. This grid of 36 stations was completed at 0014 h 24 July.

An intensive grid in the area surrounding Race Bank was then started, with the intention of trying to do the majority of towing in daylight to avoid fishing gear. A total of 41 stations were completed (Figure 2).

CIROLANA steamed for Lowestoft at 0837 h 25 July having completed the 322nd and last station.

Priority had been given to completing the grids to establish the distribution and abundance of crab larvae. There was insufficient time available to complete aim 2 - to study the vertical distribution of crab larvae. The continuous monitoring of chlorophyll "a" fluorescence, temperature, and salinity of sub-surface sea water was switched off at 1000 h 25 July.

CIROLANA docked in Lowestoft at 1236 h 25 July.

RESULTS

1. The following grids of high speed tow net crab larvae sampling stations were successfully completed:

Main grid	239 stations	spaced 15' Lat. x 15' Long.
Infill grid	36 stations	between main grid positions
N. Norfolk grid	41 stations	spaced 5' Lat. x 7.5' Long.
Race Bank grid	6 stations	within NRA application area
TOTAL	322 stations	

2. When time and conditions permitted, preliminary sorting of the plankton samples was undertaken. Of the 51 samples examined from the southern part of the main grid, 39 contained crab (*Cancer pagurus*) larvae (Figure 3). All larval stages from I to V were found, but no megalopae. Stage I and II zoeae were most abundant, indicating that egg hatching had occurred recently, though the presence of later stage larvae indicated that some hatching took place in June, and possibly May. The highest counts per sample (the data have not been raised to nos m^{-2} yet) were in the Race Bank area (maximum count 650 larvae) and to the south of the offshore Humber crab fishery (maximum of 2330 larvae). These figures are preliminary and un-raised, but they do suggest that the timing of the cruise was appropriate, having coincided with the hatching period, at least in the southern area.

3. Examination of the stratification parameter phi indicated that the water south of about 54°N and over the Dogger Bank was unstratified with values of <10 joules m^{-3} (Figure 4). The contour of the difference in surface and bottom temperatures ($\Delta t > 5°C$) was more or less coincident with the ≥ 50 joules m^{-3} contours. The maximum Δt of 8°C was observed in the area 55° to 56°N, and 00°30'W to 01°00'E (approximately).

4. Further results await sorting of the 322 plankton samples, analysis of the water samples for salinity, and processing, analysis and interpretation of the logged data.

ACKNOWLEDGEMENTS

The scientific staff appreciated the friendly, helpful and efficient contribution the officers and crew of RV CIROLANA made to achieving the aims of this cruise.

D B Bennett
29 July 1993

SEEN IN DRAFT

B Chapman (Master)
J Harper (Senior Fishing Mate)

INITIALLED: GPA

DISTRIBUTION:

Basic List +
D B Bennett
B M Thompson
A R Lawler
P R King
G M Layzell
M W Etherton

DI's: Lowestoft, Grimsby, North Shields

SFC's: Kings Lynn, Beverley, Newcastle-upon-Tyne

Harbour Authorities: Boston, Humber, Tees, Wear, Tyne, Blyth, Tweed.

RAF Holbeach, RAF Wainfleet

Mr I Large, Chairman Wells and District Fishermen's Society

Figure 1. Track plot for the main grid – stations 1 – 24, 31 – 242, 244, 246, 248

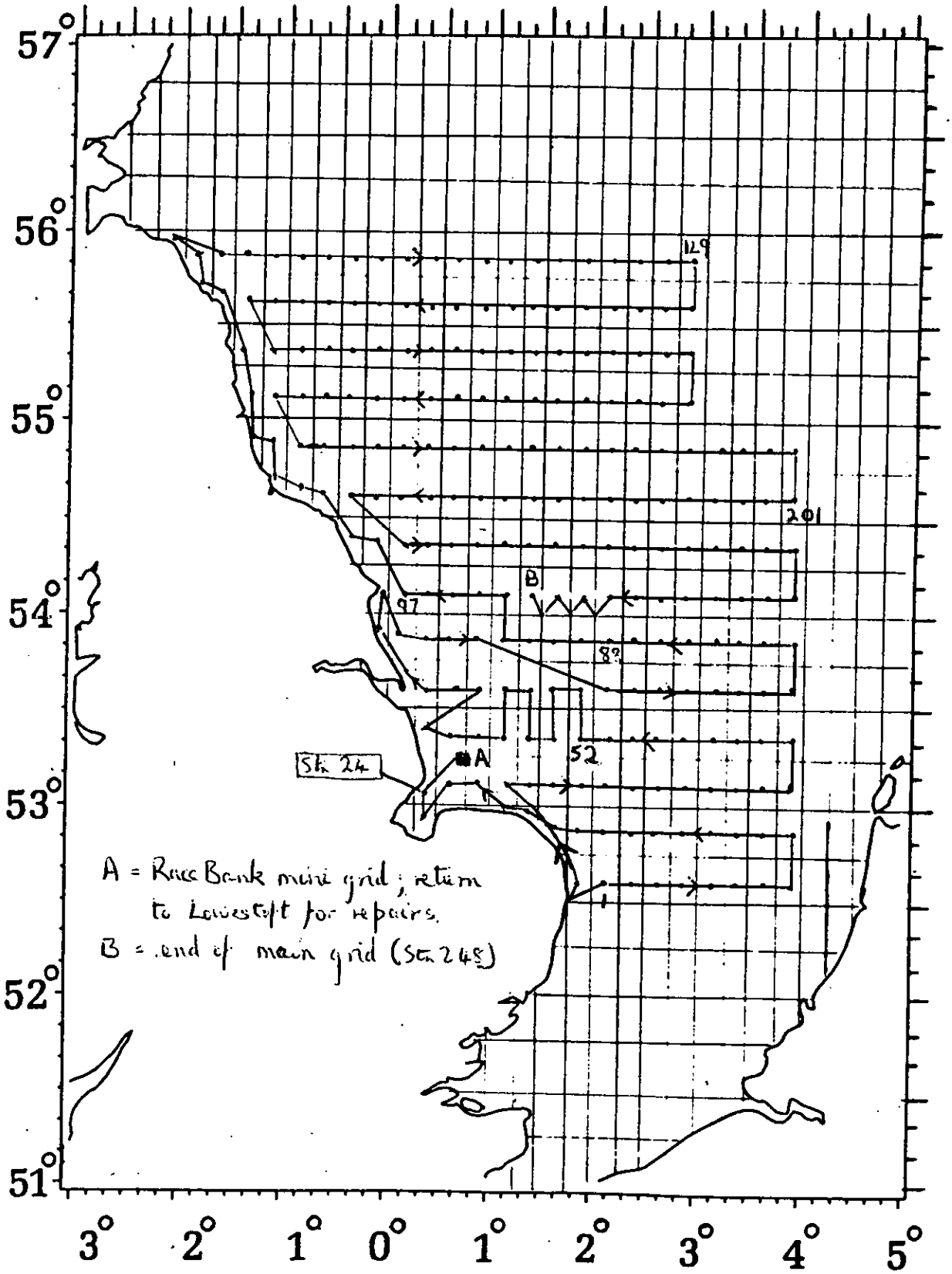


Figure 2 A. Trackplot for the infill grid - stations 243, 245, 247, 249 to 281.

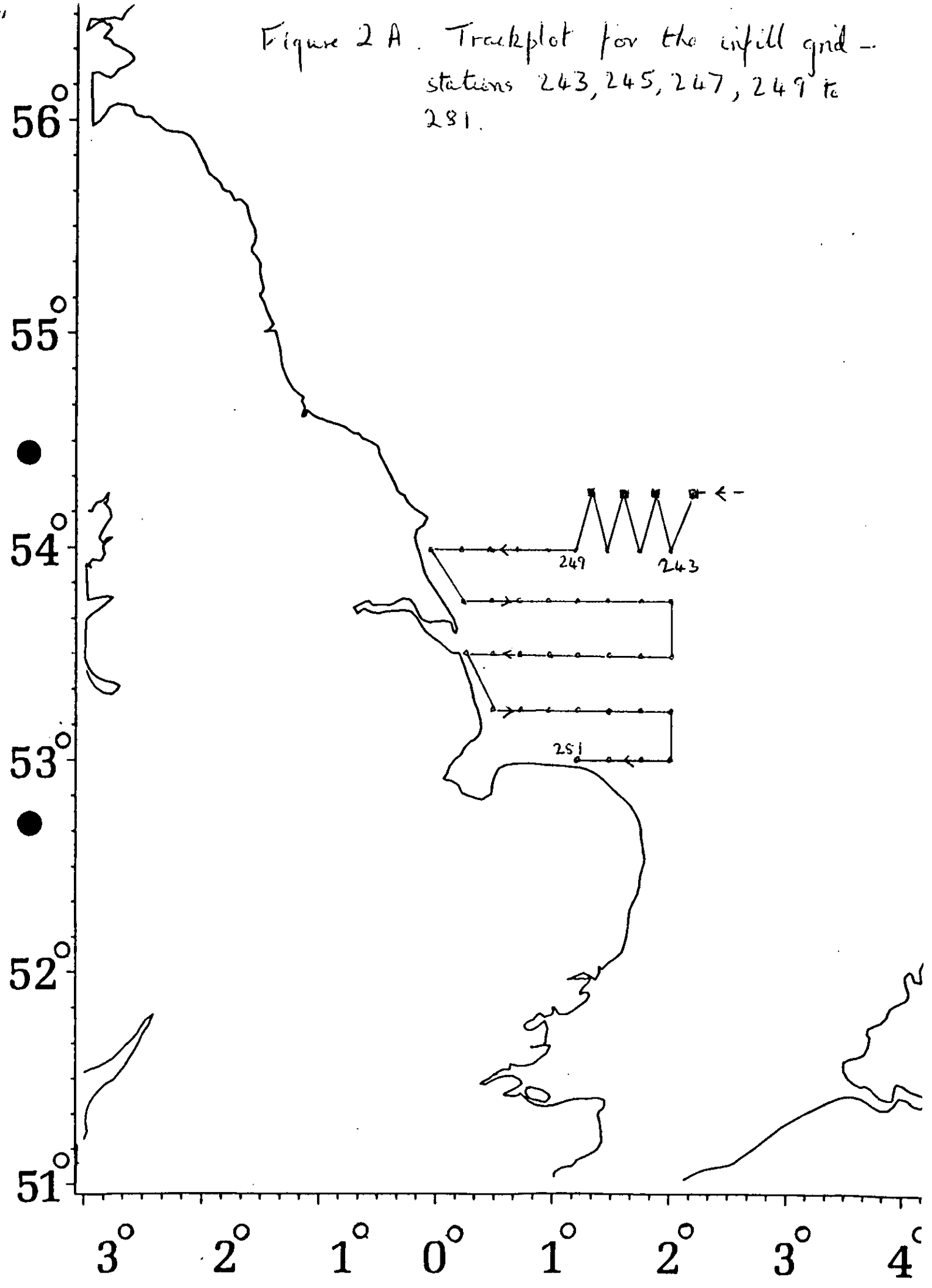
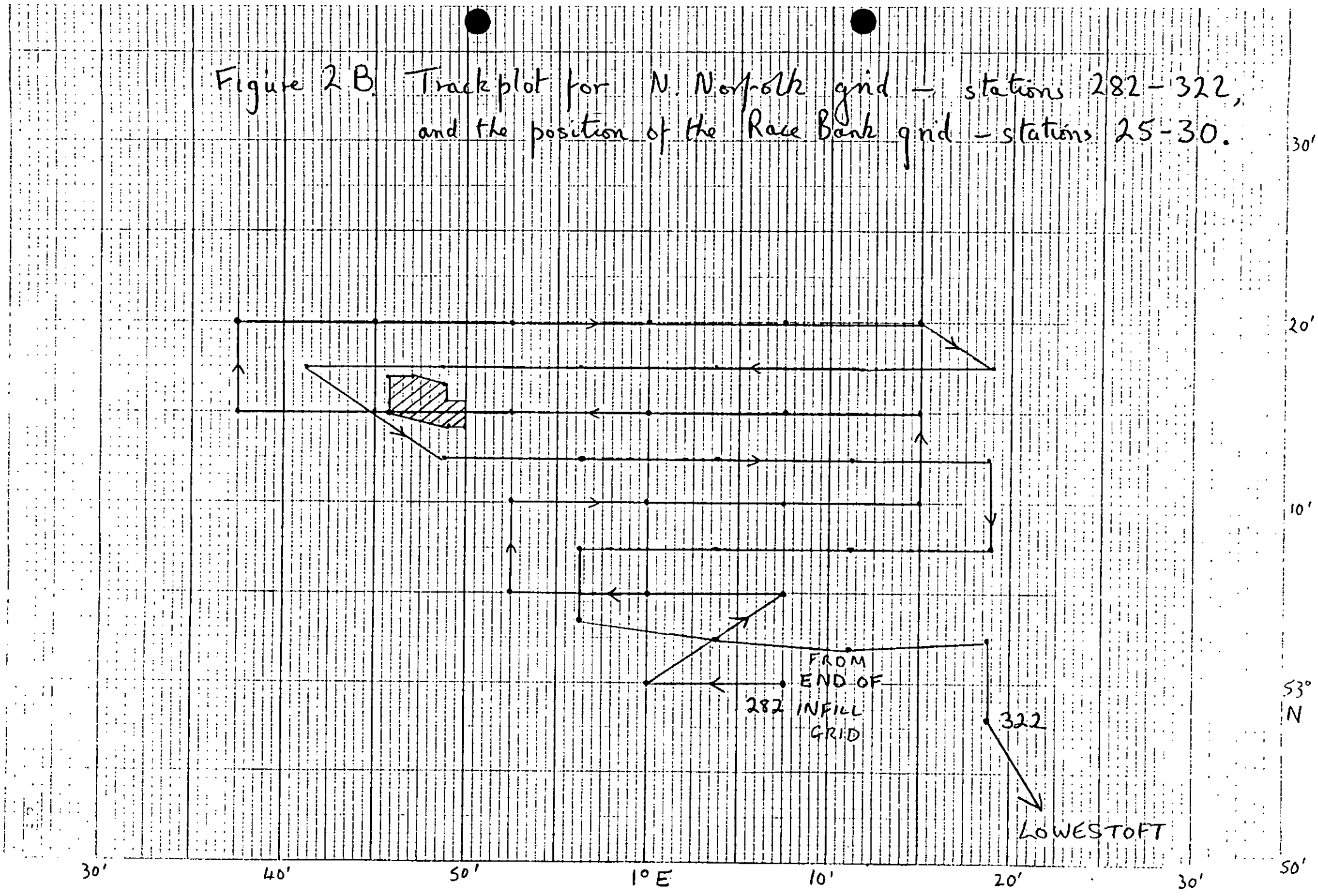


Figure 2B. Trackplot for N. Norfolk grid – stations 282–322, and the position of the Race Bank grid – stations 25–30.



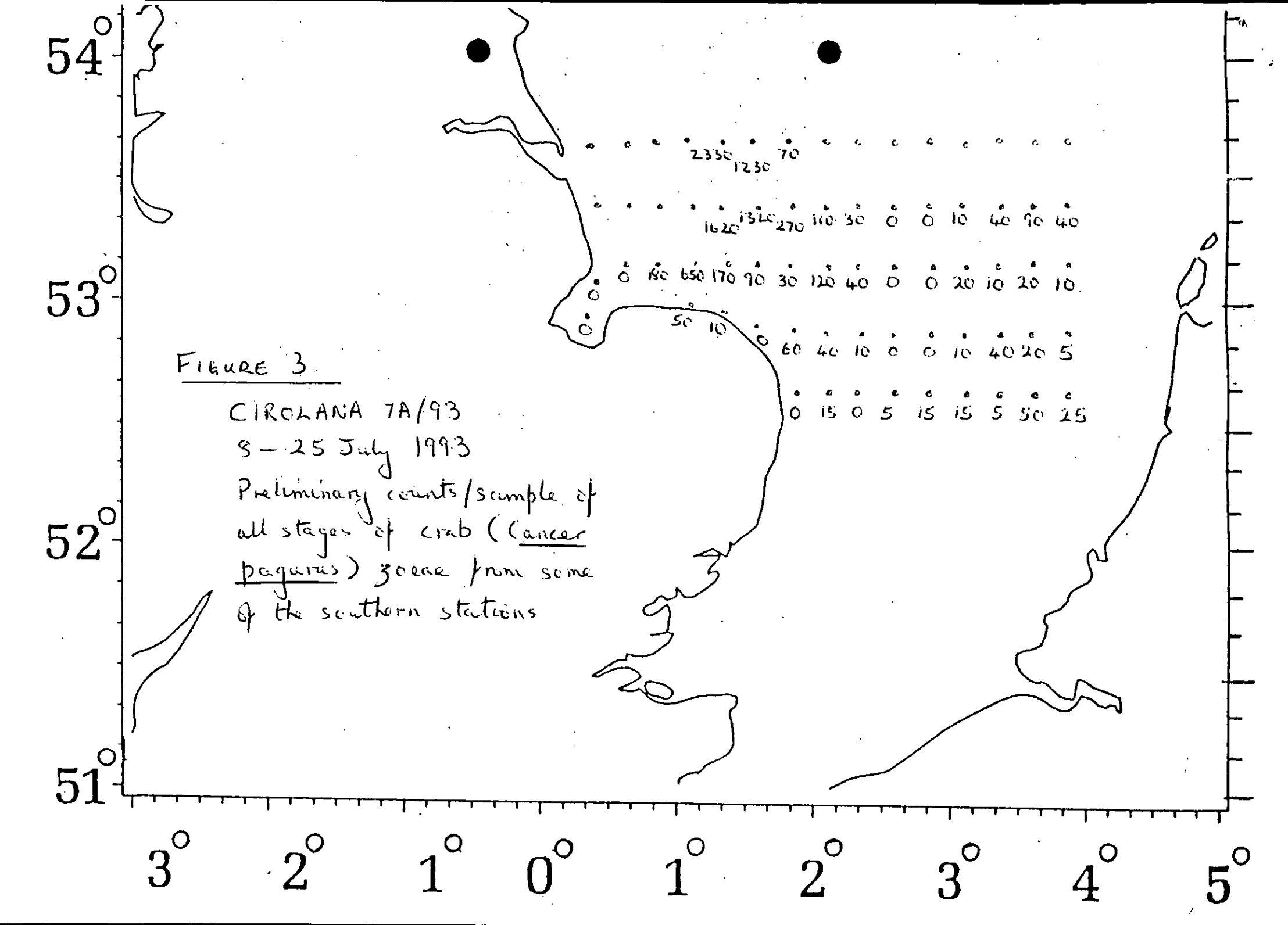


FIGURE 3.

CIROLANA 7A/93
8 – 25 July 1993
Preliminary counts/sample of all stages of crab (*Cancer pagurus*) zoeae from some of the southern stations

Figure 4. Contours ($>10<50$; ≥ 50 joules m^{-3}) of the stratification parameter phi.