MINISTRY OF AGRICULTURE, FISHERIES AND FOOD
FISHERIES LABORATORY, LOWESTOFT, SUFFOLK, ENGLAND

1993 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES, CRUISE 11b/93

STAFF: B E Spencer (SIC)
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M J Kaiser
R P Flatt
M Demestre (Dr, Sra) Spanish observer

DURATION: 18-29 October 1993

All times GMT

LOCALITY: Irish Sea

AIMS:

1. To survey the seabed and sample benthos at the experimental site off Anglesey (ref. 53 25.539N; 04 01.548W) fished intensively with a 4-m beam-trawl fitted with chain mat in April 1993.

2. To beam trawl and sample the experimental site along the four lines designated for frequent fishing disturbance (two times per year) using two intensities of fishing (x10 and x 20 tows).

3. To estimate the survival of animals caught in the cod-end using the on-board survival system over a prolonged period.

4. To measure the effect of tow duration on the survival of animals which pass through the mesh of the beam trawl.

5. To film predators attracted to a baited camera frame on the sea bed using various components of the by-catch.

6. To quantify the number of macroepibenthic animals moving onto trawled tracks by sampling with a 3-m beam trawl.

7. To measure the variance of sampling with the benthos dredge.

NARRATIVE:

The scientific staff joined the ship at Liverpool on 18 October. CORYSTES sailed at 2200 h that evening, arriving at the experimental site off the north Wales coast in the early morning of the next day. The Sercel global satellite positioning system (DGPS) was locked onto a strong signal from the temporary reference station again installed on the Great Orme, Llandudno. The experimental grid established and beam trawled in April 1993 was transcribed onto the ship's plotter and displayed with the Sextant software so that the same trawl tracks and sample stations could be worked with a high degree of precision.

Work began that morning with side scan sonar runs along the trawl grid lines to record the state of the sea bed and to search for evidence of remnant tracks from the experimental fishing activity in April. Day grab and benthos dredge samples were collected from key positions on the grid lines so that changes in the benthic community since fishing in April 1993 could be detected. RoxAnn readings were taken with every day grab for ground truth purposes, and RoxAnn track continuously logged during fishing activities.

On 20 October, 4-m beam trawling began in earnest with ten tows along the first line (10 E/W) of the experimental grid. In addition to recording the total weights of the catches, the first and last three were sorted to species level which were counted and weighed. A Ferranti Trackpoint 2 acoustic tracking system was also tested. A transponder fitted to the beam (and to other gear eg side scan sonar and Day grab, later in the cruise) provided an acoustically derived offset position of the gear relative to the ship. This data was relayed to the Sextant software which calculated, displayed and logged the gear's actual lat/long. position. Erroneous position fixing caused by interference from the ship's Simrad ES400 echosounder was solved by switching to another echosounder.

Side scan sonar runs along the avenue of 10 tows provided images of the tracks on the sea bed. Day grab and benthos dredge samples, for infauna and/or epibenthos, were also taken. When the opportunity arose Triglidae, sole (*Solea solea*), and monkfish (*Lophius piscatorius*) from the catch were kept in the survival tank to monitor their survival over a few days.

On 21 October strong northerly winds and a high sea swell prevented scientific sampling until the evening when a start was made beam trawling the 20 E/W line. This was continued overnight and completed in the afternoon of the next day after 15 h of fishing. Both 10E/W and 20 E/W lines were surveyed with side scan sonar and sampled with Day grab and benthos dredge by early evening. With the prospect of continuing good weather, a start was made on beam trawling 20 N/S, which again continued overnight, and was completed on the afternoon of 23 October after 20 h of fishing. Surveys and sampling occupied the rest of the evening.

On 24 October, 10 N/S, the final line, was trawled and completed after 15 h of fishing and then surveyed and sampled.

On 25 October, with continuing good weather, two stills cameras, attached to frames, were deployed on the line fished the previous day. A weighted onion bag filled with a "cocktail" of fish, representative of the main fish discards of the catches (gurnards, small soles, rays and dragonets) was tied across the bottom of each frame, within the view of the camera. The cameras were set to film every 2 minutes in an attempt to identify predators within the area that feed on fish discards. The frames were recovered about 6 h later. In between, and after

this activity, Day grab and benthos dredge samples were taken from within the "exclusion zone" (the area designated in April for single event fishing) to obtain evidence of longer-term effects of fishing activities on the benthic communities.

With the main scientific objectives of the cruise achieved, and with no more time available to attempt the subsidiary aims, CORYSTES set sail later that evening and docked on the morning tide of 29 October.

RESULTS

1. *Sextant* survey software (new version - *9.34 MAFF customised*) continued to provide highly accurate position lines and sampling points Figure 1) thus enabling accurate vessel placement over the experimental grid. Displays were enhanced to show exclusion zone and catch disposal sites. The associated post processing package (*Geoplot* - available on trial basis) was used to provide detailed plots at sea. This enabled swift quality control assessment of sampling positions and produced high quality plots for inclusion in the report (Figure 2).

   No problems were experienced with Sercel DGPS. To eliminate the need for a DTI licence, aerial signal power output was reduced to 10% of that used on the April cruise. Despite this the Gt. Orme signal, because of the high elevation of the aerial, was strong and dependable.

   RoxAnn continued to provide useful information on bottom sediment type and for logging ship position over the experimental site. As in the April cruise, it was evident that the fished areas gave different E1 and E2 values to adjacent unfished areas. New box files were used for intercomparisons with other cruises, though no stable 'calibration site' as such exists in this area.

2. All of the four lines were beam trawled to the required intensity and sampled with Day grab and benthos dredge. A preliminary assessment suggests that dead-men's fingers, hydroids and echinoderms are still the dominant fauna in terms of biomass and number.

   The trial of an acoustic trawl and towfish tracking system (*Trackpoint II*) yielded good results after resolving frequency conflicts with other ship's instruments.

   Estimated gear and sampling positions during beam trawling are shown in Figures 3 and 4.

   Side scan sonar provided clear images of beam trawl tracks, their coverage (50-100 m wide) and their rate of decay, eg the 10E/W tracks were still visible after 4days. Preliminary inspection of the charts show no evidence of tracks made last cruise.

3. Survival of a range of discard fish species after 72 h (reduced time period because of bad weather) in tanks of running sea water were sole 75%, gurnards 25% and *Lophius* 0%. Mortality again appears to be caused by excessive scale loss and bruising.

5. Two stills cameras on frames baited with fish were deployed for 6 h to film predators in the vicinity of a trawled track.

4. Not completed due to lack of time.
6. "
7. "

The eye-stalks of 20 *Cancer pagurus* were collected for lipofuschin studies (J Wickins, FLC).

B E Spencer, SIC
28 October 1993

SEEN IN DRAFT:

R Taylor, Master.
R Graham, Senior Fishing Mate.

R. Taylor
R Graham.

INITIALLED:

DISTRIBUTION: 9/12/93

Basic List +

B E Spencer	S I Rogers
M J Kaiser	R P Flatt
W J Meadows	M Demestre
S D Utting	

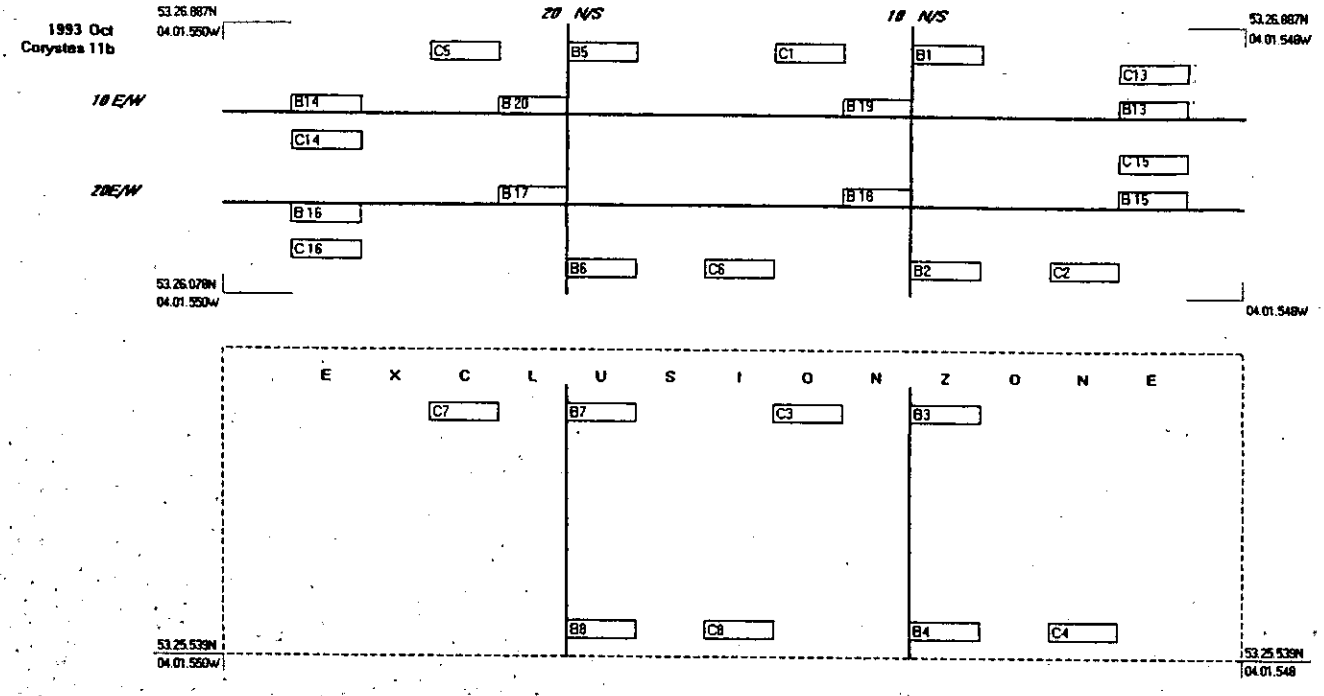

Figure 1. Experimental grid used for studying the effects of 4-m beam trawling on the seabed in the Irish Sea. Continuous lines denote trawled areas; boxes denote areas sampled for infauna with the Day grab and benthos dredge. The 'exclusion zone' is an area where no further fishing will occur (fished once in April 1993), but that will continue to be sampled to monitor subsequent changes in the benthic community.

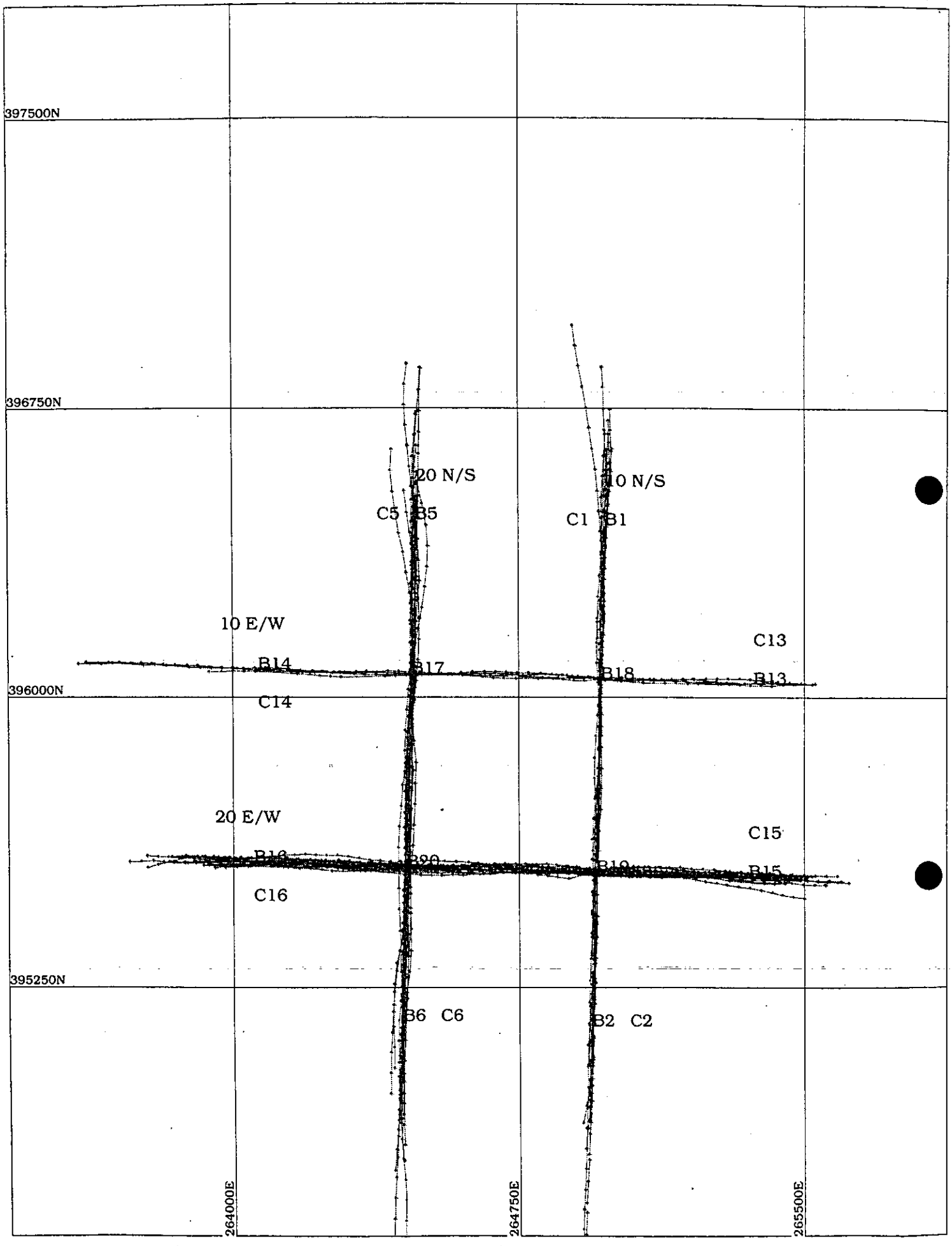

Figure 2. The plotted positions of the RV Corystes while trawling the experimental grid. Position was obtained from a *Sercel* DGPS, linked to *Sextant* software and displayed by *Geoplot* software.

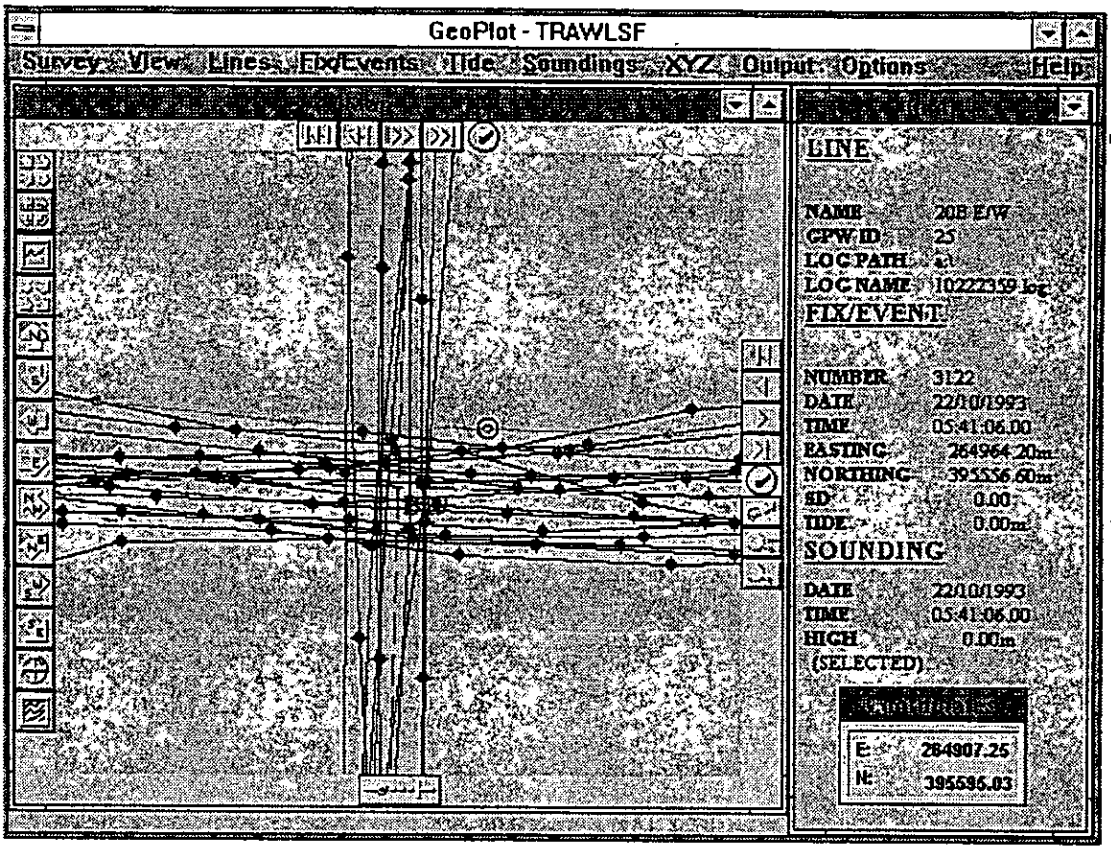

Figure 3. *Geoplot* display window showing the intersection between the plots of the 20E/W and 10N/S trawl tracks.

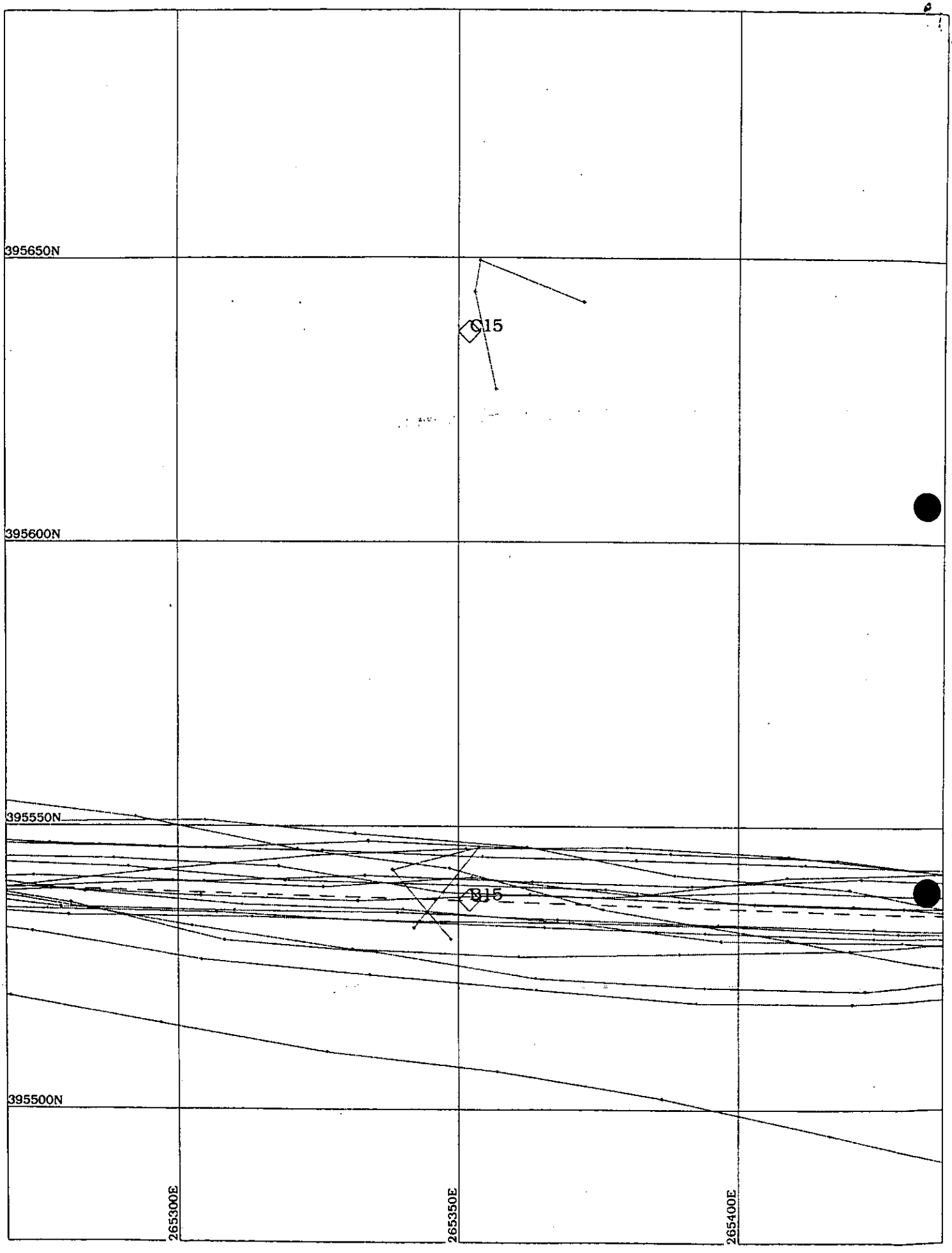

Figure 4. The plotted ship's track after fishing the 20E/W line, showing the position of the 4 Day grabs taken from the control (C15) and trawled site (B15).