

CEFAS, PAKEFIELD ROAD, LOWESTOFT, SUFFOLK, ENGLAND

1998 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 7

STAFF:	Dr J Brown	Mr L Fernand
	Miss J Taylor	Mr J Read
	Mr K Medler	
Part 1	Dr D Mills	Ms A Joyce
	Mr S Oosterhuis (NIOZ)	Mr S Gonzalez (NIOZ)
	Dr C Whalley	Mr B Riches (9 - 10 July)
	Mr G Ryan (WS) (9 - 10 July)	
Part 2	Dr E Young	Mr A Young
	Miss L Carrillo (UWB)	

UWB - University of Wales, Bangor
 NIOZ - Netherlands Institute for Sea Research
 WS - WS Oceans

DURATION: 3 - 24 July

LOCALITY: Part 1 - North East coast and Thames (3 - 10 July) (Figure 1).
 Part 2 - St. George's Channel and Celtic Sea (10 - 24 July) (Figures 2 & 3).

AIMS:

Part 1 was directed at a better understanding of the dynamics of the circulation processes fringing the north east coast of England, between the Firth of Forth and Flamborough Head, and in vicinity of the Dogger Bank. It is intended to characterise the extent and nature of the density driven and seasonal jet like circulation which, from previous work in the Irish Sea and limited historical data, we believe acts as a direct and rapid pathway for transport of material from the coastal region to the central North Sea. Subsequently, the knowledge will be viewed with respect to concerns that elevated levels of contaminants on the Dogger Bank have originated in the near coastal region. In addition, several moorings in the vicinity of the Thames will be serviced as part the Climatic Status of UK Coastal waters programme.

Part 2 is directed at a better understanding of the dynamics of the circulation processes in the Celtic Sea/St. George's Channel region. As on the North-east coast, it is intended to characterise the extent and nature of the seasonal density driven circulation.

The main sampling aims of the cruise were:

1. To undertake Scanfish, CTD and grab surveys of the North East coast to collect information on nutrients, suspended sediment and metals.
2. To service two moorings in the vicinity of the Thames.
3. To deploy four mooring arrays in the Celtic Sea/St. George's Channel.

4. To deploy free floating satellite tracked buoys in the Celtic Sea/St. George's Channel in order to determine the Lagrangian circulation.
5. To undertake associated physical and chemical surveys of the region in support of 3) and 4).

NARRATIVE (all times GMT):

CORYSTES sailed from Lowestoft at 1600 (3 July) for a position offshore of the River Tyne and a trial Scanfish line. En-route, a trial CTD was undertaken near the Wash. Following Scanfish trials (4 July), a line was completed north-east from Sunderland (Fig. 1). Based on the data, a line of CTD and water bottle stations was occupied, followed by a repeat of the line for sediment samples using the NIOZ corer. During the latter, a hydraulic hose failure on the coring winch delayed progress for several hours. The failure occurred when the instrument was close to the bed, however, through the use of a block and the crane it was possible to lift the corer approximately 10 m away from the sea bed whilst repair to the winch was effected. Subsequently, a north-south line was undertaken with Scanfish (6 July) followed by CTD stations. Intended coring work and a section into the Dogger Bank was abandoned because of poor weather. Instead, a line of CTD's were occupied from the Farne Deep to the coast (7 July) and the positions repeated with the NIOZ corer. Following this, CORYSTES made for the Thames Estuary (8 July), undertaking a CTD on the southwest corner of the Dogger Bank and one east of Lowestoft en-route.

On arrival in the Thames (9 July), two smart biophysical moorings (SBM) were recovered, before Mrs Joyce was put ashore and Mr Riches and Mr Ryan brought on board. CORYSTES anchored over night before redeploying the inner of the two moorings. Meanwhile, Mr Riches replaced the faulty interface unit between the Cercel navigation and the laboratories, whilst Mr Ryan set-up the Aqua Monitor water sampler and nitrate analysers. The following day (10 July) the inner mooring was replaced and Dr Mills, Mr Oosterhuis, Mr Gonzalez, Mr Riches and Mr Ryan were put ashore at Southend, whilst Dr Young, Mr Young and Miss Carrillo joined the ship. CORYSTES then sailed for the Celtic Sea, arriving 13 July after sheltering at anchor from bad weather in Tor Bay for 36 hours.

Work commenced with a series of ARGOS buoy deployments (A1, A2, A9, A10, A11 & A12; Fig. 2) in moderating conditions before the commencement of the first of the Scanfish legs (S5; Fig. 2). The latter was rapidly halted when a dahn buoy was fouled and the towing cable damaged at the junction with the Scanfish. The towing cable on the second Tin Tow winch was attached and the line recommenced, whilst the other cable was repaired. The line proceeded into S1 and toward the Bristol Channel. Approximately 25 miles before the end of the line (15 July), communication with the Scanfish became intermittent and the instrument was recovered. It was diagnosed that there was a break in the cable junction to the Scanfish. Whilst repairs to the cable were effected and the potting compound on the other cable cured, Argos buoys A14, A15 and the 'U'-shaped mooring K were deployed. Following this, the remainder of S1 was occupied.

Overnight (16 July) Argos buoys A4, A5, A6 and A7 were deployed and a Scanfish line (S3) commenced north-west from Devon. This was followed by the laying of the ADCP mooring at H and a further Argos deployment A13. Subsequently, S10 was undertaken overnight, enabling CORYSTES to dock for 3 hours in Fishguard for freshwater (17 July). The Scanfish towing cable was again reterminated before Scanfish lines S8 and S7 were occupied,

interspersed by Argos buoys A16 - 19. Subsequently, mooring J was laid in St. George's Channel, followed by S2, A8, mooring I and A25.

CORYSTES then made for shelter in Cardigan Bay from the southerly winds associated with yet another low pressure system. After anchoring overnight, Scanfish lines S6 and S12 were undertaken (20 - 21 July). However, the northern end of S6 had to be moved 10 miles to the west to avoid a field of dahn buoys and deteriorating weather conditions meant that part way along S12 the course of the ship was altered by 20° toward the south in order to keep the swell on the beam and reduce snatching of the towing cable.

Following this, mooring H was visited en-route to S4, whereupon it was found that the marker toroid at the site was missing and attempts at interrogating the acoustic release on the ADCP frame proved fruitless. A search pattern was instigated about the site of the mooring, utilising the strong wind to drive the ship across the site whilst attempting to interrogate the release acoustically. Eventually, a return was received from the instrument approximately 300 m to the south of the deployment site. This was surprising as the region had been swept several times already. At first light (22 July) the recovery operations commenced and as the recovery line failed to release the instrument was recovered by dragging. The frame was slightly damaged and the wires had been 're-rigged'. Subsequent inspection of the ADCP record revealed that the frame had been recovered at 1510 21 July as CORYSTES approached the site and redeployed at 2330 (22 July). During the time, a French trawler had been working in the vicinity of the site and it would appear that she had relayed the mooring, although she failed to respond to attempts to contact her on Channel 16.

Finally, two Argos buoys (A3 and A24) were laid en-route to Lowestoft. The deployment of two others further buoys to the west and a proposed Scanfish line having to be abandoned in order to dock in Lowestoft 24 July.

Throughout the cruise P Taylor (JFM) co-ordinated and logged sightings of Cetaceans, the data for which will be reported to the Marine Mammal Research Unit at Oxford University.

RESULTS (Preliminary):

1) The Scanfish and CTD lines off the north-east coast (Fig. 1) showed the water column to be stratified, with strong bottom fronts commensurate with persistent jet-like density driven circulation. CTD stations were spaced along the Scanfish lines at positions expected to coincide with the density driven flows and regions of relatively incipient residual flow. Samples were collected from the CTD for nutrients, suspended load, chlorophyll and metals analysis (100 l), whilst bottom sediment samples taken with the NIOZ corer. Unfortunately, poor weather prevented work in the vicinity of the Dogger Bank and it is hoped that this can be covered at the beginning of CORYSTES 9a/98. Data awaits further analysis ashore.

2) Moorings were retrieved at two sites in the Thames, although there were a number of instrument problems with the data logger and nutrient analysers. Also, the current meter deployed at the inner station for approximately two months had become fouled with growth, such that the conductivity cell ceased to function after three weeks. However, measurement of the current speed appears to be largely unaffected.

Only the mooring at the inner site was redeployed as there was uncertainty as to whether the data logger intended for the outer mooring was functioning.

3) Four arrays were deployed (Fig. 2). However, that at H had to be recovered on the final working day (22 July) as described in the narrative. During the six days of its deployment there was excellent data return, however such a short deployment is of little use in determining residual flows in the region as the principal tidal components cannot be determined from a record of less than 14 days. The loss of the toroid, but recovery of the instrument perhaps vindicates the approach of deploying the ADCP and marker toroid as separate rigs. Additionally, a new deployment technique was successfully employed in laying the rigs. The anchor weight and ground wire were deployed first then the ADCP frame was lowered on the Tin-Tow cable and once on the sea bed a retractor was fired electronically from the deck to release the ADCP frame.

4) 23 satellite tracked drifting buoys, drogued at 30 m, were successfully deployed at the locations shown in Fig. 2. It is intended to recover the instruments on CORYSTES 9a in late August/early September.

5) The series of Scanfish legs (Fig. 3) showed the majority of the region to be stratified, with a significant contribution from the freshwater at the mouth of the Bristol Channel and north into St. George's Channel. A tongue of cool high salinity Atlantic water extended north through the Celtic deep and into St. George's Channel. Fringing the coasts of Devon and Ireland were a series of comparatively weak bottom fronts.

The continual stream of unseasonable low pressure systems meant the loss of almost 4 days to bad weather and much of the remainder of the work was carried out in uncomfortable conditions. Consequently, elements of the North Sea work (Aim 1) and Celtic Sea (Aim 5) were not possible. It is hoped that in part these can be covered on CORYSTES 9a/98.

Finally, the hard work, enthusiasm and good humor of the ships officers and crew was much appreciated and contributed significantly to the success of the work.

24 July 1998
Dr Juan Brown
(Scientist-in-Charge)

SEEN IN DRAFT:

B Chapman (Master)
M Reynolds (Senior Fishing Skipper)

DISTRIBUTION:

BASIC LIST+

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Miss J Taylor	Mr J Read
Dr E Young	Ms A Joyce
Mr K Medler	Dr D Mills
Dr C Whalley	Ms S Palmer (SIGS)

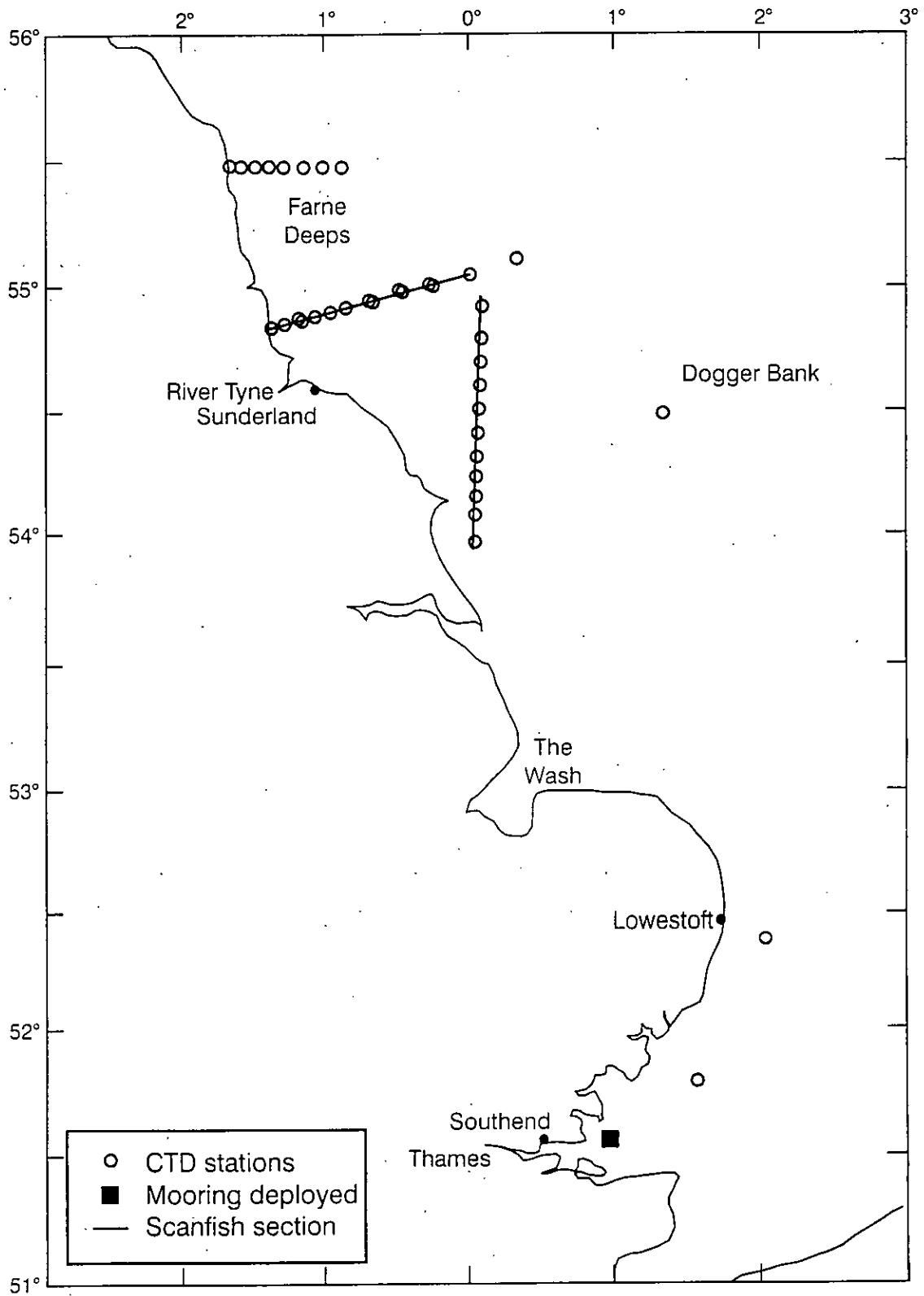


Figure 1. Location of CTD stations, Thames Mooring and Scanfish lines, Corystes 7/98

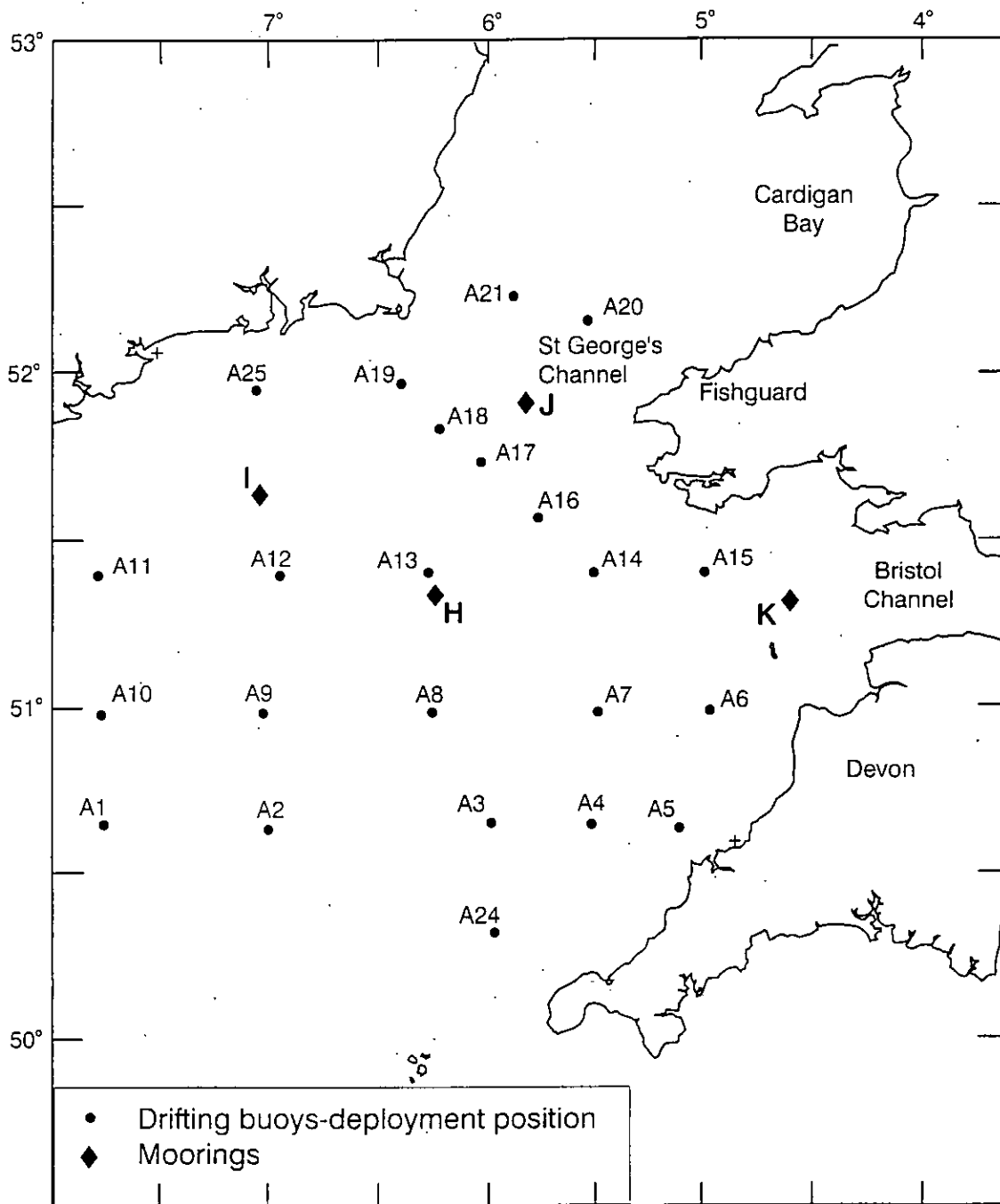


Figure 2. Locations of Argos buoy and current meter deployments, Corystes 7/98

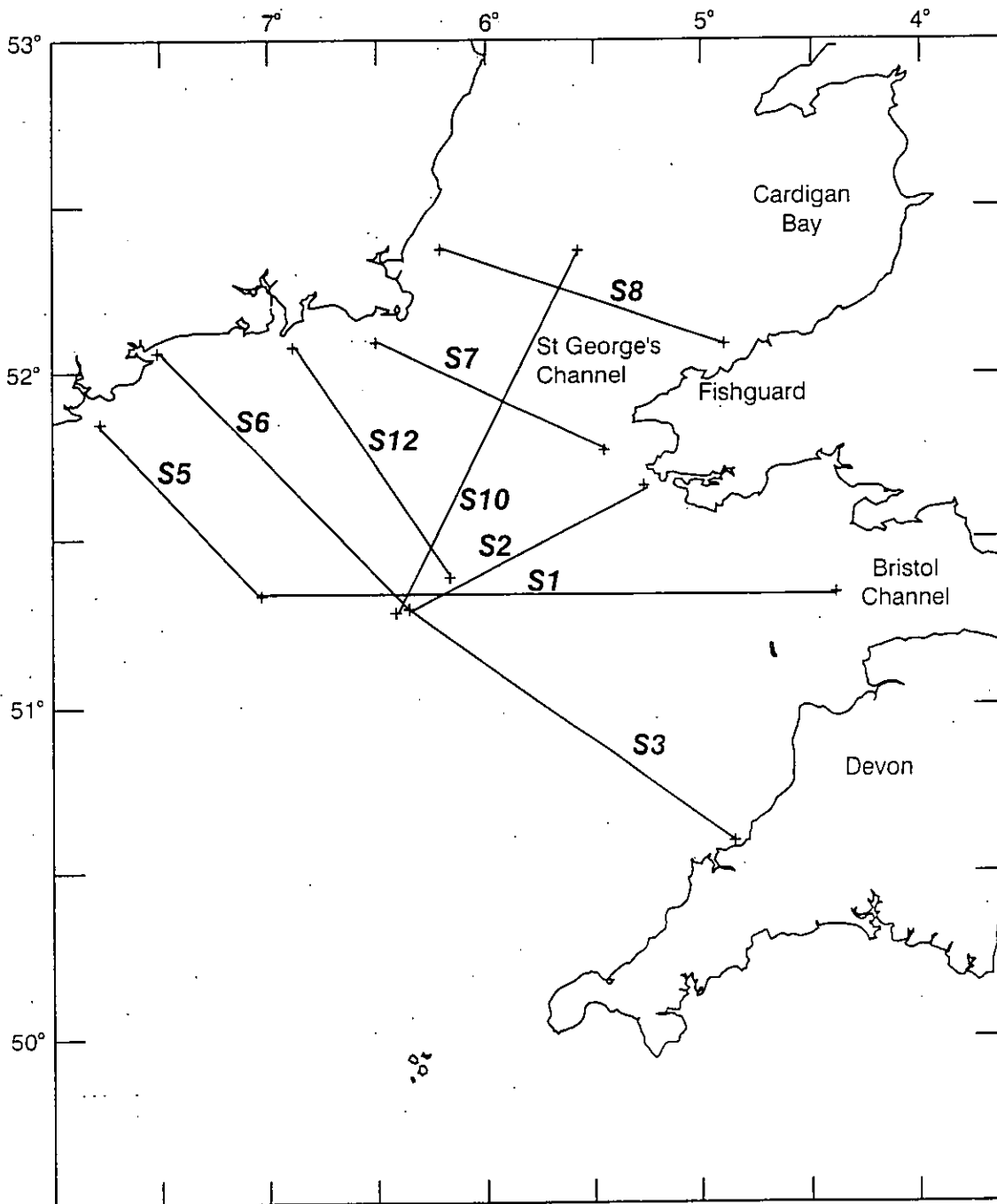


Figure 3. Locations of Scanfish sections, Corystes 7/98