

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

**1991 RESEARCH VESSEL PROGRAMME**

**CRUISE REPORT: RV CORYSTES: CRUISE 1B/91**

**STAFF:**

G.P. Arnold	
J.D. Metcalfe	
B.F. Riches	
M.O. Eagle	
M.C. Fulcher	(15-19 January)
E.G. Shreeve	(15-22 January)
A. Moore	( " )
R.J. Turner	( " )
M. Greer Walker	(23 Jan-4 Feb)
A.A. Buckley	( " )

**DURATION:** Sailed 0945 h 15 January; 1315 h 23 January  
Docked 1330 h 22 January; 1230 h 4 February  
(All times are Greenwich Mean Time)

**LOCALITY:** Southern Bight

- AIMS:**
1. To release 100 plaice fitted with dummy data storage tags and 100 controls fitted with conventional Petersen discs.
  2. To collect pituitaries and urine samples from plaice and dabs.
  3. To test the prototype data storage tag (DST).
  4. To track plaice fitted with a prototype pressure sensitive telemetry tag (for the DST development programme).
  5. To track mature plaice on their spawning grounds.

**NARRATIVE:** Corystes sailed at 0945 h on 15 January and proceeded to Smiths Knoll to commence aim 1. Work started at 1400 h, but because of poor weather was not completed until 2230 h. Trials of the large-scale version of the data storage tag were carried out the following day, before fishing in midwater for live plaice the next night on the western edge of the Hinder plaice spawning area. The data storage tag trials were completed successfully on 17 January and trials of the pressure-sensitive telemetry tags conducted on 18 January. Further midwater fishing was carried out during the night of 17-18 January, when damage was sustained to the Engels 800 trawl, and again the following night. Corystes returned to Lowestoft on the morning of 19 January to put Mr Fulcher ashore by rubber boat and collect electronic components. A plaice fitted with a pressure-sensitive acoustic tag was released during the afternoon of 19 January off Orfordness and tracked for 8 h, before the signal was lost on the sea bed. Corystes then steamed to the North Falls to resume midwater trawling for live plaice. A second plaice fitted with a pressure-sensitive tag was released at 1200 h on 21 January and tracked for 5 h before the tag signal was lost in midwater. It was relocated briefly after a 3 h search, but was lost again close to the surface in a moderate to heavy swell. Corystes then returned to Lowestoft for a 24 h mid-cruise break, during which the Atlas 5600 radar was repaired and fishing gear and scientific staff were exchanged.

Work on aim 5 commenced during the evening of 23 January on the western edge of the Hinder plaice spawning area. The first fish was released at midnight, after a series of tag trials. The tag signal was lost after 13 h and not found again, despite an extensive search lasting until 0730 h 25 January. A second fish fitted with a long-life acoustic tag was released later the same morning in the same area. It was followed for 6 days and by 1130 h 31 January had reached the northern tip of the Swarte Bank. A third

plaice was released on the edge of the Flamborough Off Ground during the afternoon of 31 January. This fish, which stayed on the bottom and moved only a short distance, was abandoned at 0930 h 2 February. Corystes then steamed to Markhams Hole to carry out aim 2 of the programme. Bottom trawling commenced at 1500 h 2 February and continued until 2100 h the next day with a break overnight. Corystes then set course for Lowestoft and docked the next day.

## RESULTS:

1. Two hundred tagged plaice were released at 5 stations to the south of Smiths Knoll.
2. Pituitaries and urine samples were taken from approximately 500 and 100 plaice, respectively; 40 plaice ovaries were deep frozen for Dalhousie University (Canada) for genetic studies (mitochondrial DNA).
3. The prototype data storage tag worked well and recorded depth profiles which closely matched those recorded simultaneously by a Guildline instrument mounted alongside it (Fig. 1).
4. The pressure-sensitive tags also worked well. The telemetry signal was easily decoded by the sector scanner operator and it was possible to record the depth of the fish at frequent intervals. The tag signals were, however, lost rather too easily, particularly when the fish was on the bottom. This problem was probably related to the size of the pressure tag (over twice as long as the standard transponder) and the burying behaviour of the fish.
5. A 44 cm maturing female plaice fitted with a long-life 300 k Hz transponding acoustic tag was tracked for a record period of 6 days. During this time it moved approximately 150 km north from a release position near the centre of the Southern Bight plaice spawning ground to a final position just south of the Flamborough Off Ground (Fig. 2). The fish was finally lost on the northern tip of the Swarte Bank when the tag batteries began to fail and the pulse length fell by 60%. The fish travelled north by selective tidal stream transport (Fig. 3), moving into midwater at the beginning of each of 10 north-going tides and returning to the sea bed after approximately 6 hours. During each midwater excursion the fish covered more ground than the tide, swimming downtide at an estimated speed through the water of  $1-1.2 \text{ L s}^{-1}$ . It swam very close to the surface by day and night. The track, which was some 50 h longer than the previous longest track, was achieved during an extended period of calm weather, which greatly assisted the operation. Contact with the tag would, however, have been lost on several occasions had it not been for the skills of the ships officers and crew and the precise position-fixing afforded by the GPS satellite navigation system. This facility has not been available during previous tracking cruises.
6. The attempt to track plaice caught during the cruise, and identified with a particular ground or tide, was abandoned because of the damage inflicted on the fish by the midwater trawl. Most individuals suffered severe bruising of the head and tail and mortality during the cruise was more than 25%. The fish were caught during a series of short hauls (1-1.5 h) and the damage is probably results from hauling the gear through the ship's wake.

G P Arnold  
4 February 1991

SEEN IN DRAFT: M.J. Willcock (Master)  
R.F. Graham (Senior Fishing Mate)

INITIALLED: J G S (Deputy Director)

DISTRIBUTION: Basic List +  
G.P. Arnold                      A Moore  
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M.C. Fulcher                    M O Eagle

**Ground track of a maturing female plaice  
(length 44cm), using a longlife acoustic  
transponding tag. R.V. Corystes 1B/91,  
25-31 January 1991.**

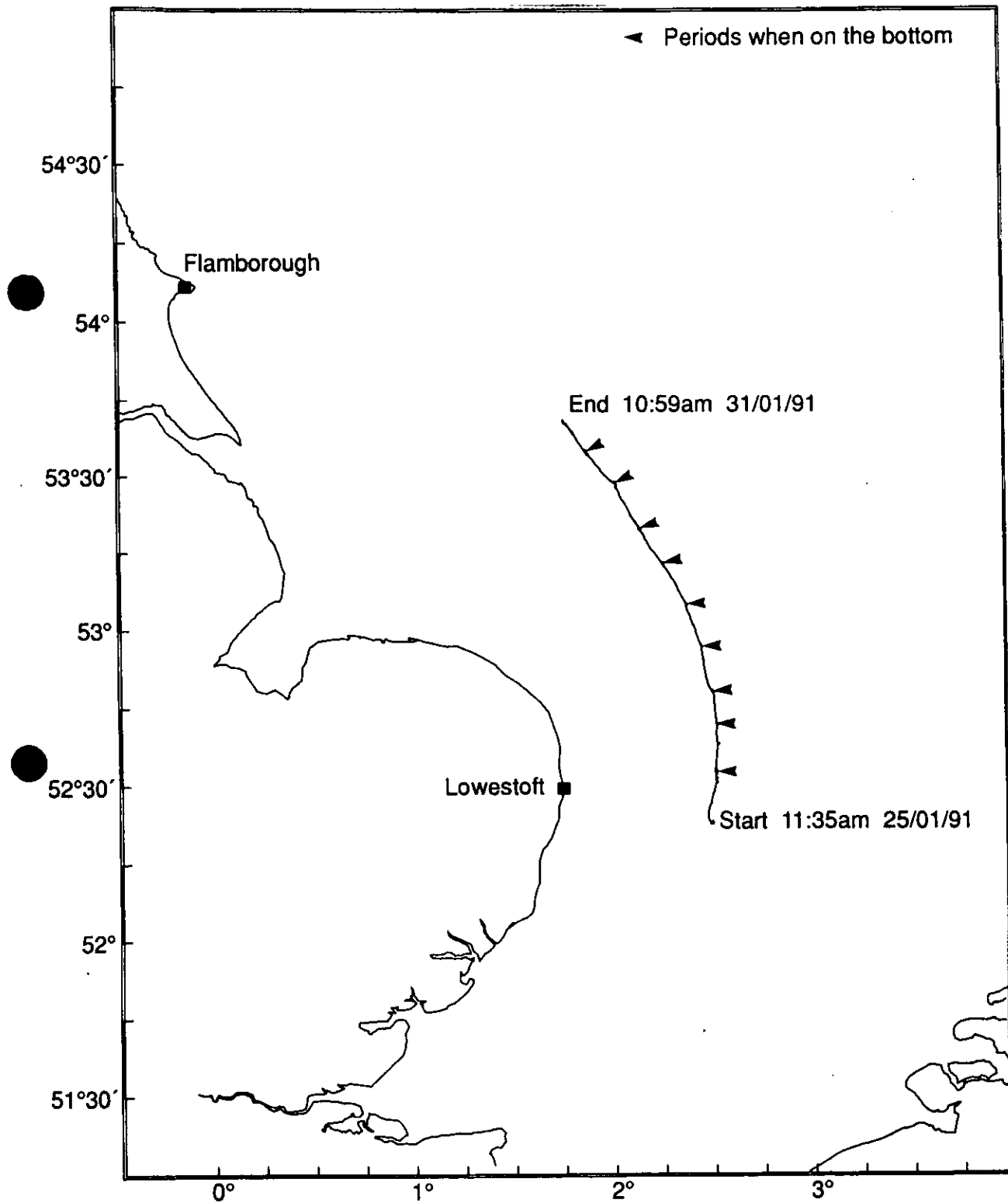


Fig.1

Depth plots recorded by a. guideline transducer & b. macro data storage tag, Corystes 1b/91.

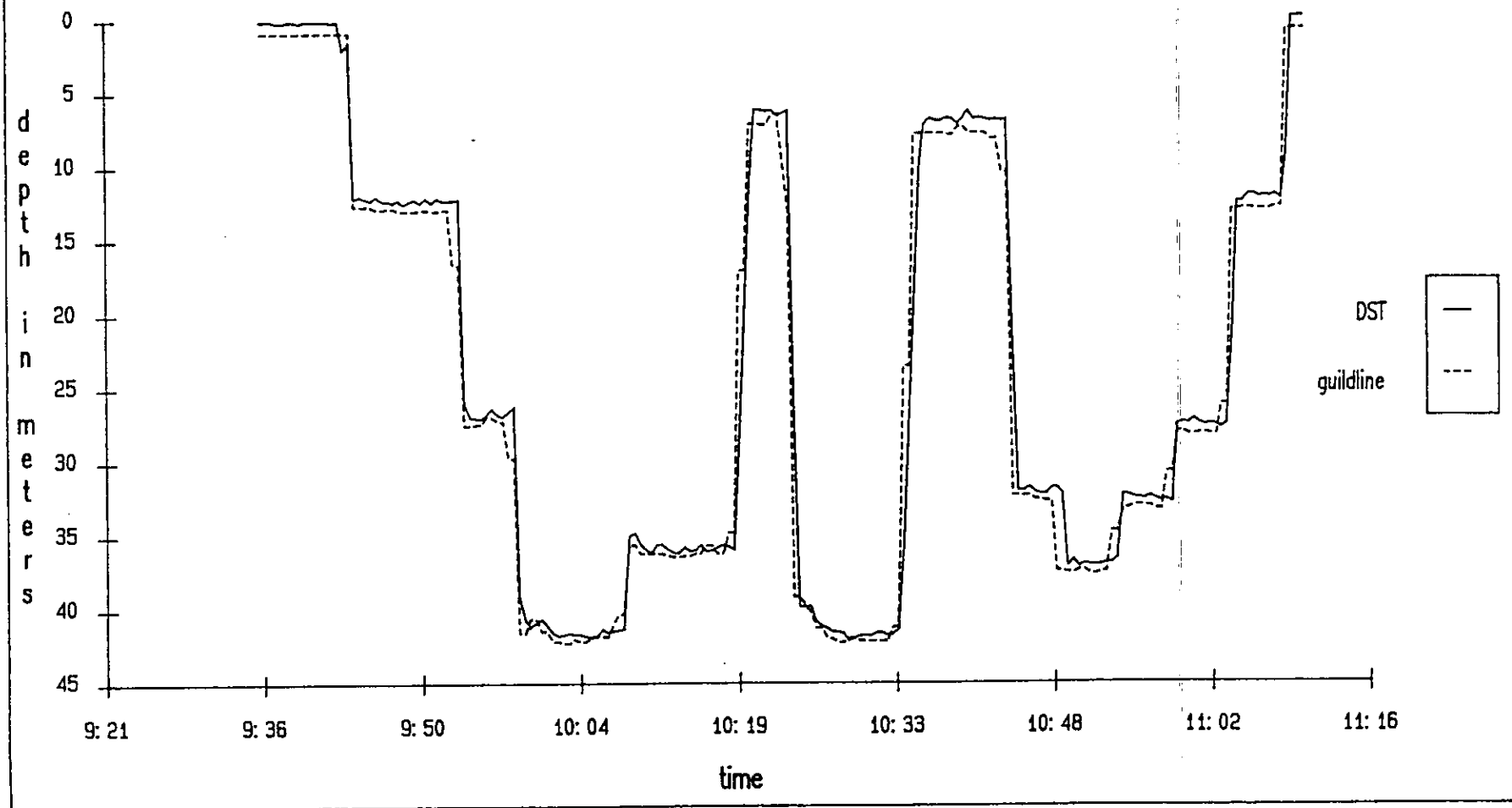


Fig.3

Vertical track of a maturing female plaice (length 44cm), using a longlife acoustic transponding tag. RV Corystes 1B/91,25-31 January 1991.

