

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

1998 RESEARCH VESSEL PROGRAMME

REPORT: RV CORYSTES: CRUISE 12/98

STAFF: JD Metcalfe (SIC)
BH Holford
BF Riches
AA Buckley
MO Eagle
BD Rackham
T Locke (11-18 December)

DURATION: Left Lowestoft 1830 h, 1 December 1998
Docked Lowestoft 17 h, 18 December 1998

LOCALITY: Southern North Sea/eastern English Channel

AIMS:

1. To estimate swimming speed and orientation of plaice on their pre-spawning migration by simultaneous use of sector scanning sonar and ADCP.
2. To catch live plaice for fecundity studies
3. To assess the precision of geolocation using the POL tidal model in conjunction with hydrostatic data logged by data storage tags.

NARRATIVE: (All times are Greenwich Mean Time)

CORYSTES sailed at 1830 h on 1 December and proceeded overnight to the South Falls area in the Southern Bight of the North Sea (approx. 51° 20' N, 01° 45' E). Fishing for pre-spawning female plaice commenced at 0900 h on 2 December and continued until 1900h when problems developed with the trawl winches and further fishing had to be abandoned. Fish tracking commenced the following morning; after brief tag trials, a 49 cm female plaice (E60 6495), equipped with a long-life transponding acoustic tag, was released at 1145 h (3 December) at 51° 23.36'N, 01° 46.77'E, mid-way through a north-going tide. The fish initially remained on the sea bed, but moved into mid-water when the tide turned and moved south along the western side of the South Falls bank. The fish was tracked for almost 6h before being lost in mid-water. A search for the fish continued until about 2100h, but had to be abandoned due to failure of the sector scanning sonar mode control, the result of seawater entry into the control cable junction boxes. CORYSTES subsequently steamed north-west to anchor overnight off Margate to take shelter from strong north-westerly winds.

The following 3 days (4, 5 & 6 December) were spent repairing the electrical faults to the sector scanner. During this time (on 5 December) CORYSTES proceeded to Dover to put the Chief Engineer ashore for medical treatment. CORYSTES subsequently steamed east and anchored off Deal.

Repairs to the sector scanner were completed by about 1315 h on 7 December and CORYSTES proceeded to the South Falls to resume fish tracking. A second female plaice (41 cm, E69 7058), equipped with a long-life transponding acoustic tag, was released at 1643 h at 51° 21.42'N, 01° 46.31'E, mid-way through a north-going tide. This fish moved north-east across the sea bed, but was tracked for less than an hour, being lost during a total ship-board power failure. A third female plaice (39 cm, E69 7092) was released at 2047 h at 51° 23.76'N, 01° 46.97'E. This fish was tracked moving north-north-east by selective tidal stream transport until 1125 h on 10 December when, once again, the sector scanner developed a fault due to entry of seawater into the control cable junction boxes. The faults were repaired and the fish relocated at 1745 h. Tracking continued until 1840 h when the scanner mode control developed a fault. The fault was corrected by about 1930 h and a search for the fish commenced. The fish was found at 0230 h (11 December) and tracking continued until 0615 h when the fish was lost whilst moving north in mid-water. A search continued for four hours but was unsuccessful and tracking was abandoned at 1025 h.

CORYSTES subsequently steamed first to Lowestoft to pick up crew and scientific staff, and then to the plaice spawning ground in the eastern English Channel in an area centred on approximately 50° 05.00' N, 00° 14.00' W. Fishing for plaice (Aim 2) commenced at 0940 h on 12 December and continued until 1420h. CORYSTES subsequently steamed east and anchored off Margate to shelter from westerly gales.

CORYSTES continued to shelter from strong winds on 13 December. As the weather moderated on 14 December, CORYSTES steamed to the South Falls to resume fish tracking. A fourth female plaice (E69 4429, caught and tagged earlier in the cruise), equipped with a long-life transponding acoustic tag, was released at 1926 h at 51° 24.48'N, 01° 47.32'E, at the start of a north-going tide. This fish was tracked until 1225 h on 18 December when tracking ceased and CORYSTES returned to Lowestoft to put the Captain ashore for medical reasons.

CORYSTES docked at 1700 h on 18 December.

RESULTS:

1. *Fishing for live plaice* occurred on two occasions. On the first occasion (2 December) 13 fish were caught in a total of 8 hauls. Of these, 5 females (mostly ripening) were considered suitable for tracking, fitted with tag saddles, and retained in sea water deck tanks. The fish were either caught on the sea bed during north-going tides using a 4 m steel beam trawl, or caught in mid-water on south-going tides using an Engels 800 mid-water trawl. In either event, the gear was towed for 15 minutes on each haul.

On the second occasion (12 December) 106 plaice were caught in 9 hauls, of which 22 ♀ and 84 ♂ fish were retained; a few damaged fish were discarded. Fish were caught using a 4 m steel beam trawl towed for 15 minutes on each haul. The fish were retained aboard for the remainder of the cruise put ashore at Lowestoft.

2. *Fish tracking.* Four ripening adult female plaice (Fish 1 to 4) fitted with long-life acoustic tags were followed for periods of 5.5, 0.75, 81.5 & 89 hours respectively. Fish 1 & 2 were tracked for short periods only, being lost as a result of technical problems with the sector scanner (Fish 1) or the ship (Fish 2).

Fish 3 established a very distinct pattern of vertical movement soon after release, (Fig. 1) and was tracked over a distance of 79.68 km as she migrated north north-east (Fig. 2) by selective tidal stream transport on 5 consecutive north-going tides. The fish, which was lost and then found on two occasions, was tracked in total for 81.5 h and finally lost whilst moving north in mid-water.

Fish 4, released during a north-going tide, initially moved south across the seabed. During the following south-going tide, the fish moved into mid-water and travelled 6.17 km south-west. Subsequently the fish changed its behaviour to exploit the north-going tidal streams (Fig. 3) and travelled 50.60 km north-east by selective tidal stream transport on 5 consecutive tides (Fig. 4). The fish was abandoned in order to return to Lowestoft.

Measurements of the speed and direction of the tidal streams were made with the ADCP operating continuously during the tracks of the fish. Valuable data for calculating swimming speed and orientation of the fish were gathered during each mid-water excursion. The long-life tags worked extremely well giving clear signals out to over 350 m. Fish 4 was equipped an acoustic tag powered by silver oxide rather than mercury cells, the latter cells being no longer commercially available. Although this test was not exhaustive, the tag performed well for the duration of the track with no detectable difference from tags powered by mercury cells.

A number of problems occurred with the sector scanning sonar during the cruise. Serious electrical faults developed with the sector scanner package mode control on a number of occasions. These were the result of seawater entering the electronic junction boxes through damage to the outer shielding of the interconnecting cables. Repairs were effected on each occasion allowing operation of the sector scanner to continue, although a problem with the sector scanner's pitch and roll gyro stabilisation system remained. The damage done by the sea water indicate a full overhaul of the package's electrical wiring will be needed. An additional fault was identified with the transmission of the transducer mode signal from the scanner console to the scanner PC, which resulted in a failure to log correctly the sonar transducer mode. This appeared to be a result of damage to the opto-isolated IO board in the sector scanner's PC.

3. *Accuracy of estimates of geolocation.* Time did not permit this aim to be attempted.

JD Metcalfe
21 December 1998

SEEN IN DRAFT: W Harding, (Chief Engineer)
R Graham, (Senior Fishing Mate)

INITIALLED:

GPA

DISTRIBUTION:

Basic list + JD Metcalfe BH Holford
BF Riches AA Buckley MO Eagle
BD Rackham Clerk, Eastern Sea Fisheries Committee
Foreign and Commonwealth Office

FIGURE CAPTIONS:

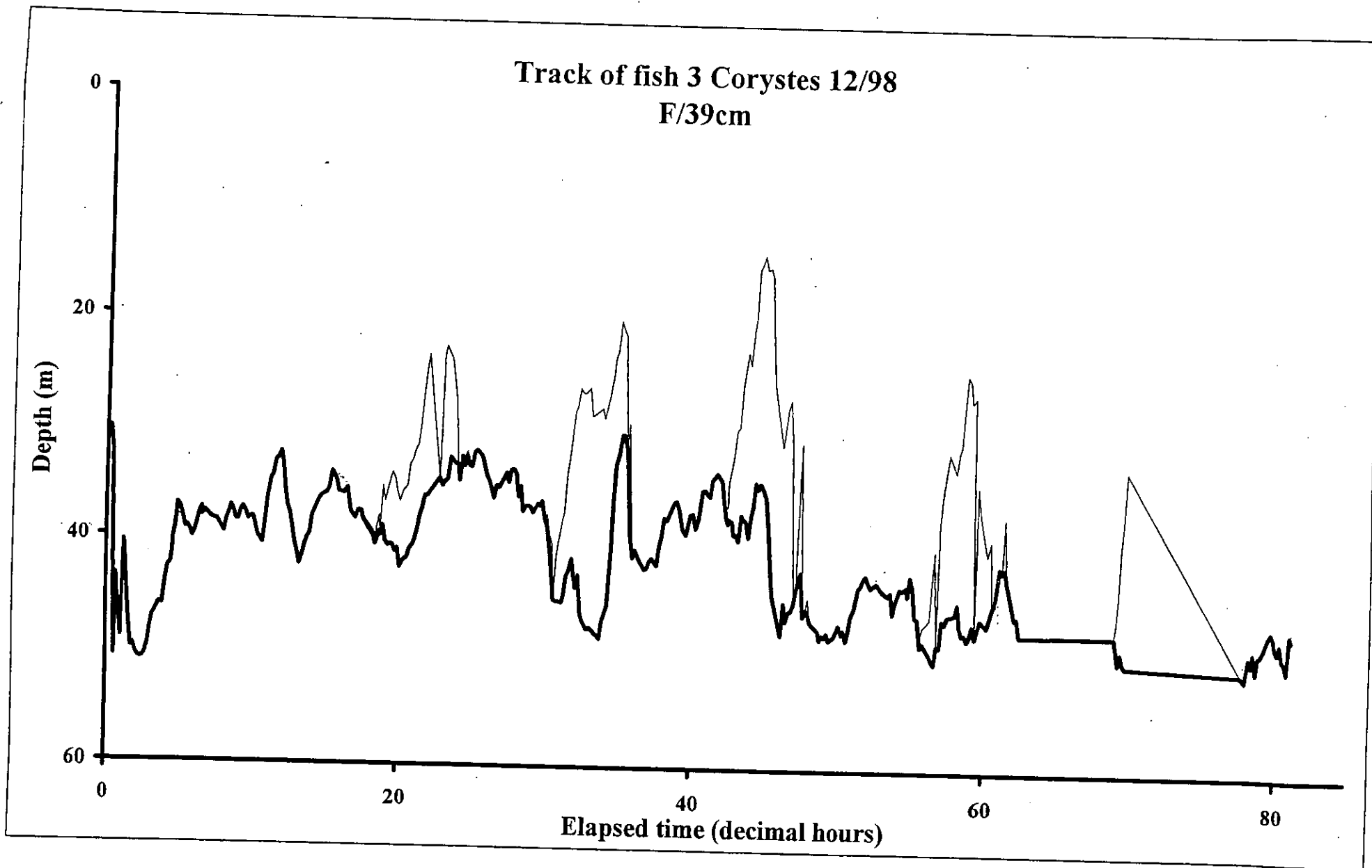
Figure 1. The vertical track (7 point running mean with bottom contact preserved) of fish 3 (39 cm, Petersen tag no. E63 7092),(fish: — ; sea bed: —).

Figure 2. The ground track of fish 3: 2047 h, 7 December - 0615 h, 11 December.

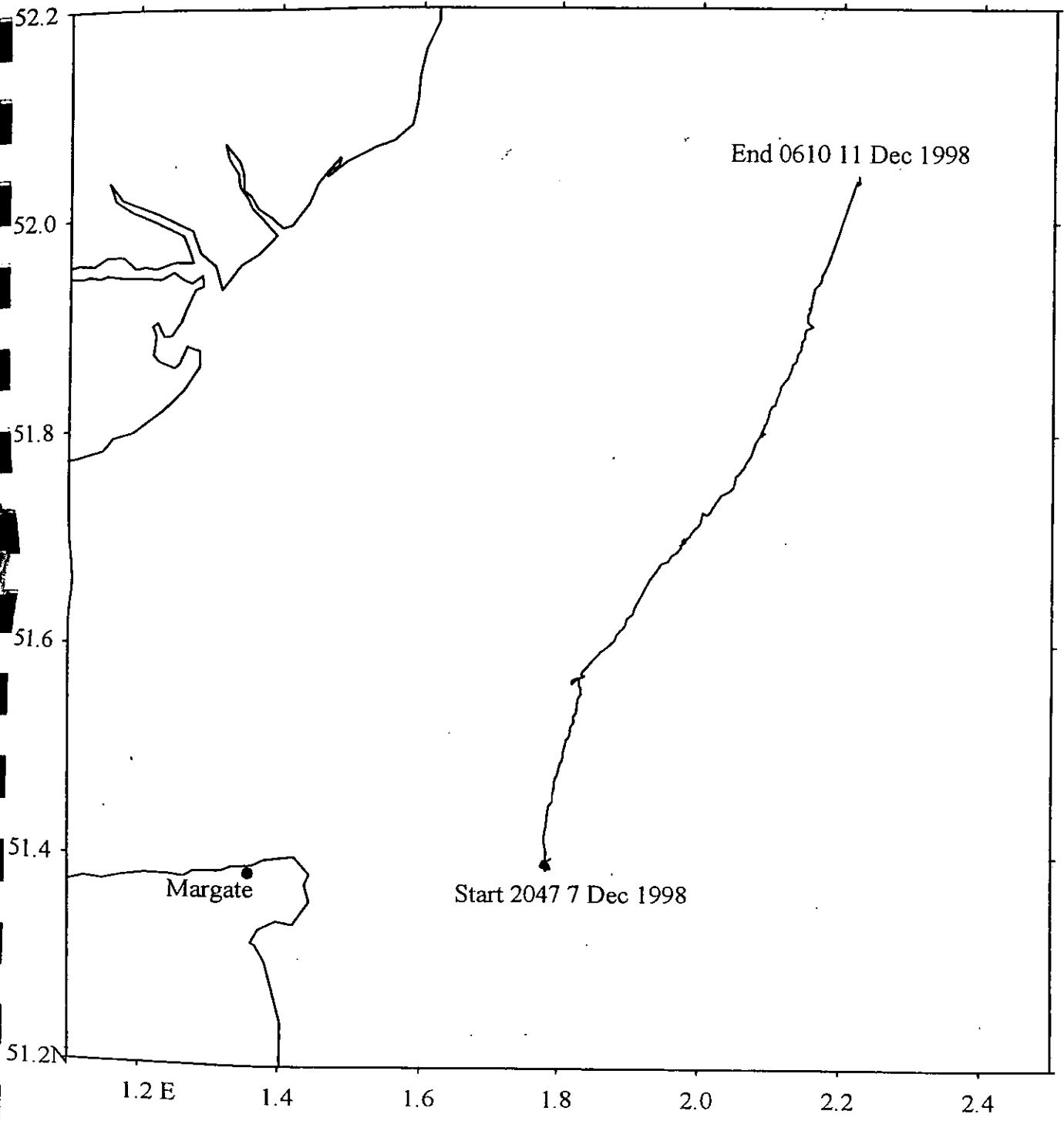
Figure 3. The vertical track (7 point running mean with bottom contact preserved) of fish 4 (35 cm, Petersen tag no. E69 4429),(fish: — ; sea bed: —).

Figure 4. The ground track of fish 4: 1927 h, 14 December - 1225 h, 18 December.

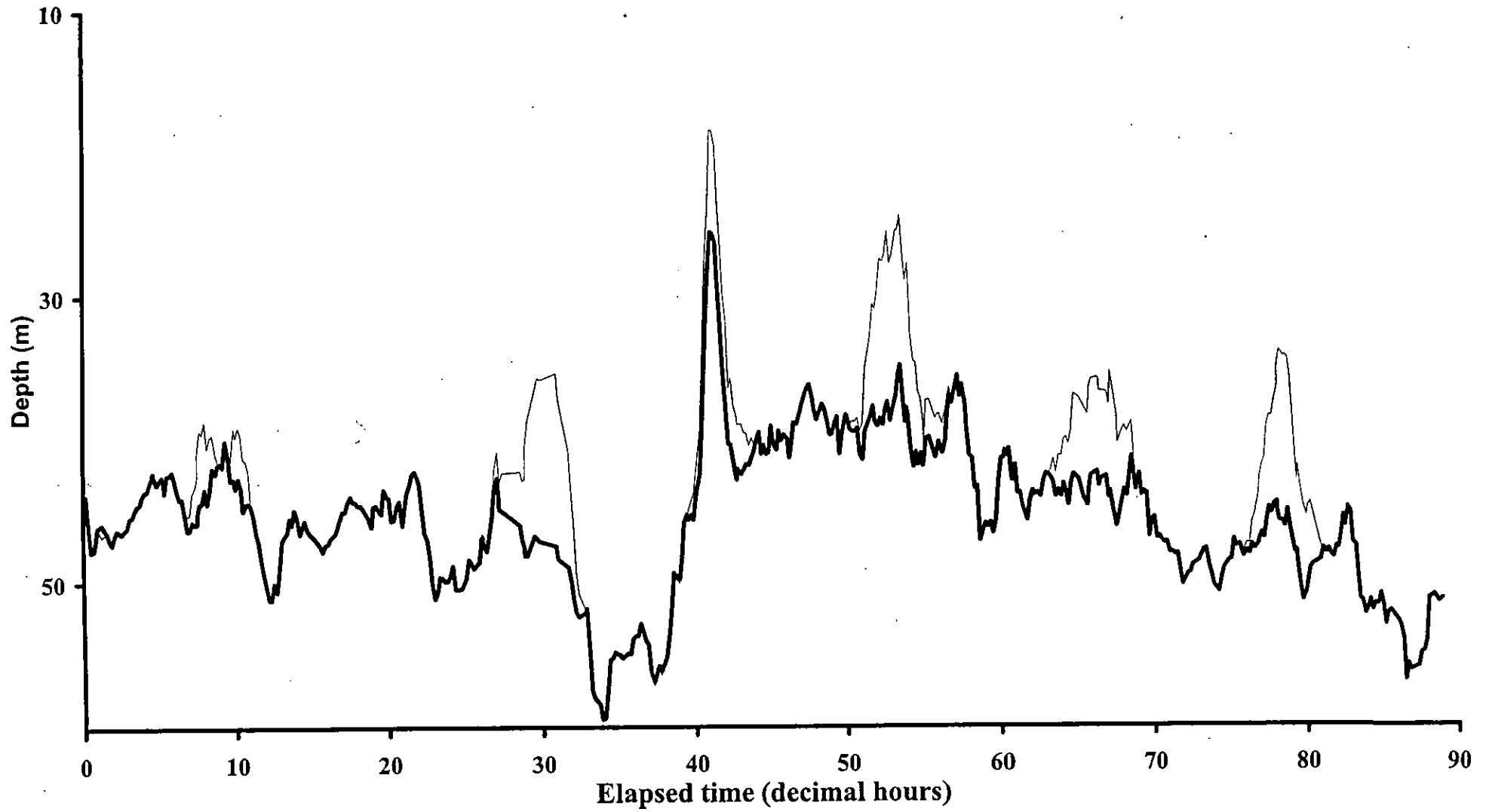
Track of fish 3 *Corystes* 12/98
F/39cm



Track of Plaice 3 (Female 39cm), Corystes 12/98.



Track of fish 4 *Corystes* 12/98



Track of Plaice 4 (Female 35cm), Corystes 12/98.

