VESSEL	RRS JOHN MURRAY
CRUISE PERIOD	7-16 October 1980

PERSONNEL

R F C Mantoura	PSO
P H Burkill	HSO
N J P Owen	HSO
P G Watson	SSO
M B Jordan	HSO
E M S-Woodward	SO
R J M Howland	SO
A J Pomroy	SO

ITINERARY (See attached charts)

Sunday	5 October	Travel to Barry transfer and install equipment.
Monday	1 October	Departure on evening tide cancelled due to westerly gales, force 7-8/9 winds, with steep decline in pressure.
Tuesday	7 October	Persistent gales. Remained in Barry.
Wednesday	8 October	Lock out Barry 0900. Proceed along the less exposed Avonmouth leg of the Monitoring Track (St. 10, 12, 11 and 13). Pick up M. Jordan off Barry 21.00. Proceeded St. 34. Strong NW winds causing heavy rolling of ship and making plankton sampling hazardous. Heave to off Breaksea. Monitoring discontinued.
Thursday	9 October	0600 proceeded to Carmarthen Bay (CB). 1600 commence CB grid St. 29, 28, 27 .... 2,1.
Friday	10 October	0400 completed CB grid. EXPRO and primary production sampling at St. 1 and 6. Current meter deployment 0830. Strong NE-E gales imminent - shelter in Milford Haven Fish Dock. Process samples and equipment maintenance.
Saturday	11 October	Gales E-NE 7-8. Shelter in Milford Haven. Work up of data at hand.
Sunday	12 October	Lock out 06.45. Proceed to St Gowan's lightship. Commenced Westerly Approach leg to CB grid. EXPRO at St. 29, Coring St. 31, MULEX tows St. 24. Commence ^{15}N-EXPRO and Nutrient excretion experiments.

	Further gales forecast. Proceeded to shelter in Sandy Haven, Milford Haven.
Monday 13 October	Departed Sandy Haven (0645). Proceeded CB. Cancelled the planned visit by the U. of Swansea scientists. Water samples St. 24. Coring St. 31 (14.00). Hand tows for zooplankton experiments St. 17 (1700). Further gales. Sheltered in Sandy Haven. Strong NE-E gales.
Tuesday 14 October	Storm bound at Sandy Haven (E-NE gales).
Wednesday 15 October	0900 Depart. Navigational restrictions imposed by the Firing Range considerably lengthened the transit route to CB. Worsening weather. Shelter in Sandy Haven.
Thursday 16 October	Poor weather prospects. Abandoned attempts to return to CB for dye diffusion experiment and to recover current meter array. Locked into Milford Haven Fish Dock. Pack up equipment.
Friday 17 October	Load equipment into vehicles. Disembark and travel to Plymouth.

OBJECTIVES

a) To continue the series of five "MULEX" cruises designed to quantify nutrient cycling processes in Carmarthen Bay, including:

1. Nutrient excretion rates of the zooplankton assemblage
2. Nutrient demand rates by the phytoplankton assemblage
3. Nutrient regeneration rates by the benthos
4. Nutrient upflux from sediments
5. Nitrification/denitrification processes by bacteria
6. Nutrient advection and diffusion from the surrounding regions of Carmarthen Bay, and dispersion within the bay.

b) To continue the monitoring of the Bristol Channel and Severn Estuary.

OUTLINE OF PROCEDURES AND METHODS

a) The following state variables were measured along the 29 station grid in Carmarthen Bay and 6 stations on the approach leg (Chart 2). Temperature, turbidity, salinity, fluorescence, microseston, POC, PON, Chlorophyll-a, phaeopigments, nitrate, nitrite, silicate, phosphate, ammonia, primary amines, urea, DOC, DON, DOP. Double-oblique hauls with the 30" Lowestoft sampler equipped with 100 um and 280 um nets were carried out at alternate stations, and counts of nitrifying and ammonifying bacteria every third station. Incident photosynthetically-active radiation (PAR) was measured continuously.

b) Shipboard experimental rate measurements of plankton, benthos sediments and water samples from CB included:

i) Multiple excretion experiments (MULEX) carried out on four size classes of zooplankton to measure respiration and excretion rates of NH_3, $R.NH_2$, PO_4, SiO_2, DOC, DON and DOP.

ii) Primary production and nutrient demand rates were measured by standard and experimental production (EXPRO) techniques using ^{14}C-CO_3, ^{15}N-NH_3 and ^{15}N-NO_3

iii) Bacterial nutrient remineralisation rates were determined using ^{15}N isotope dilution techniques.

iv) Benthic nutrient regeneration rates were determined using onboard isothermal incubation of cores and measurement of release rates of NH_3, NO_3 and O_2.

v) Estimates of nutrient advection and diffusion in CB regions will be carried out from measurements made at stations within and surrounding CB Track A chart 2.

EQUIPMENT PERFORMANCE AND OVERALL CRUISE SUCCESS

All IMER and RVS - supplied equipment functioned satisfactorily As is clear from the itinerary, only limited time was usefully spent in CB and this was over short time spells afforded between the frequent E-NE gales caused by unusual weather patterns of a succession of lows passing to the south of the UK. This amounted to 3.5 days out of 10 - but it must be emphasised, that since a complete CB grid study of all state variables was accomplished as well as a useful minimum core of 2 excretion experiments, 4 EXPRO incubations and several sediment core incubations from St. 31, and successful deployment of current metres, that useful information was obtained. The Dye diffusion experiments had to be cancelled as well as the Bury Inlet transect and the visit by scientists from University of Swansea. Only the Avonmouth-Barry and St Gowan Light - Carmarthen Bay legs of the monitoring track were completed. The recovery of the current meter will be attempted on the return leg to Barry after John Murray's next cruise engagement.

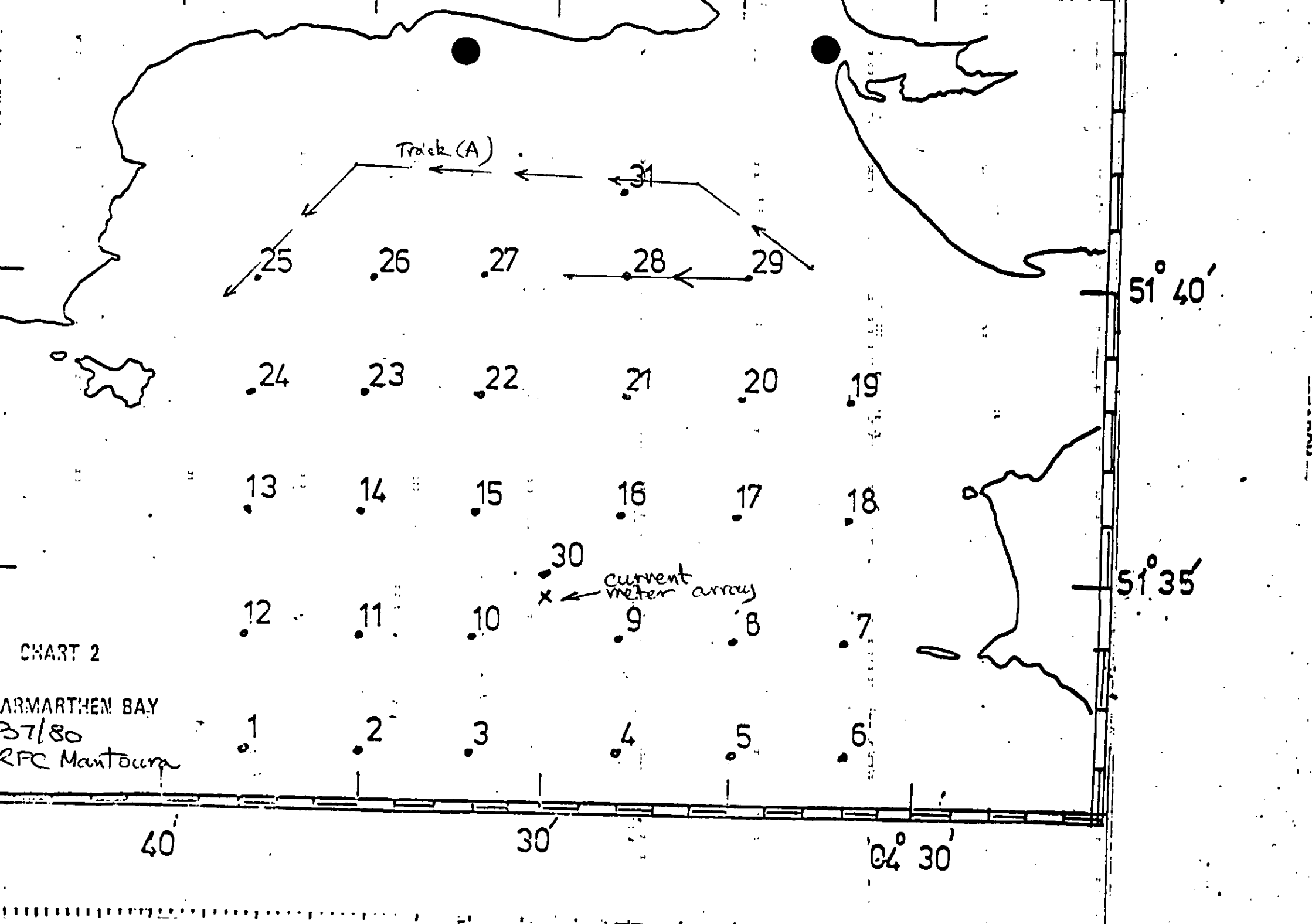
Prepared by : R F C Mantoura

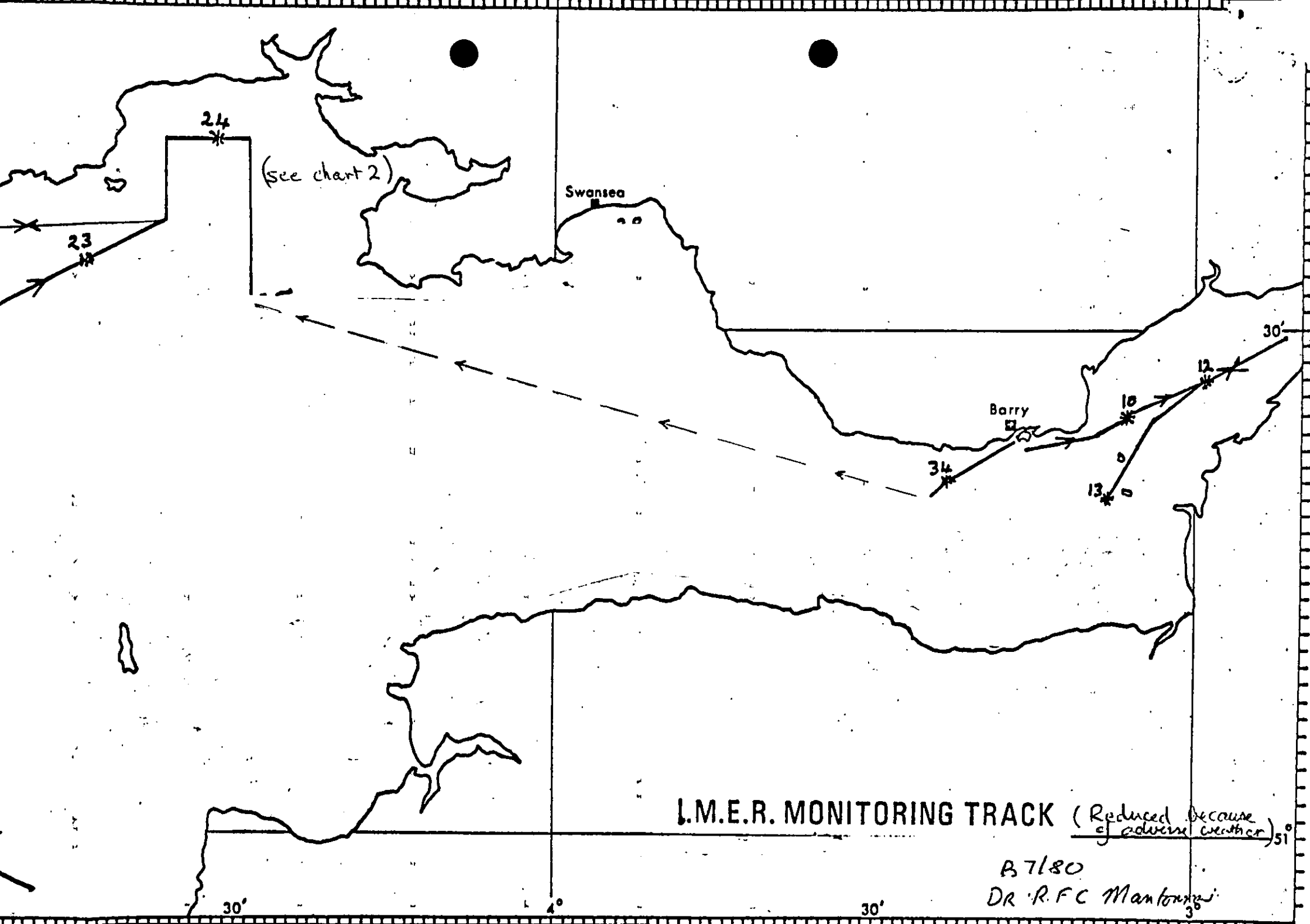
Approved by : B L Bayne

Date : 28 October 1980

CARMARTHEN BAY GRID POSITIONS (MULEX)

STATION	LAT N	LONG W	
1	51° 32'	04° 38.0'	
2	51° 32'	04° 34.8'	
3	51° 32'	04° 31.6'	
4	51° 32'	04° 28.4'	
5	51° 32'	04° 25.2'	
6	51° 32'	04° 22.0'	
7	51° 34'	04° 22.0'	
8	51° 34'	04° 25.2'	
9	51° 34'	04° 28.4'	
10	51° 34'	04° 31.6'	
11	51° 34'	04° 34.8'	
12	51° 34'	04° 38.0'	
13	51° 36'	04° 38.0'	
14	51° 36'	04° 34.8'	
15	51° 36'	04° 31.6'	
16	51° 36'	04° 28.4'	
17	51° 36'	04° 25.2'	
18	51° 36'	04° 22.0'	
19	51° 38'	04° 22.0'	
20	51° 38'	04° 25.2'	
21	51° 38'	04° 28.4'	
22	51° 38'	04° 31.6'	
23	51° 38'	04° 34.8'	
24	51° 38'	04° 38.0'	
25	51° 40'	04° 38.0'	
26	51° 40'	04° 34.8'	
27	51° 40'	04° 31.6'	
28	51° 40'	04° 28.4'	
29	51° 40'	04° 25.2'	
30	51° 35'	04° 30.0'	
31	51° 41'	04° 28.0'	
32	51° 30.6'	04° 51.2'	* Western CB Approach Leg
33	51° 30.8'	04° 54.0'	
34	51° 31.0'	04° 50.8'	
35	51° 31.2'	04° 47.6'	
36	51° 31.4'	04° 44.4'	
37	51° 31.6'	04° 41.2'	


Track (A)
31
25
26
27
28
29
24
23
22
21
20
19
13
14
15
16
17
18
30
current meter array
12
11
10
9
8
7
1
2
3
4
5
6
51° 40′
51° 35′
40′
30′
04° 30′
CHART 2
ARMARTHEN BAY
37/80
RFC Mantoura


24
(see chart 2)
23
Swansea
Barry
34
10
12
30'
13
0
I.M.E.R. MONITORING TRACK (Reduced because of adverse weather)
51°
B7180
DR R.F.C Manton
30'
4°
30'
3°

APPROXIMATE MID-TOW POSITIONS
OF PLANKTON HAULS

(modified as of B2/80,14 March 1980)

St.No.	Lat. N.	Long.W.
P 10	51°24.0'	03°06.0'
P 11	51°30.0'	02°47.0'
P 12	51°26.7'	02°59.0'
P 13	51°20.0'	03°08.0'
P 14	51°16.0'	03°21.0'
P 16	51°16.0'	03°40.0'
P 17	51°21.0'	03°48.0'
P 18	51°16.0'	04°00'
P 19	51°01.0'	04°22.0'
P 20	51°07.0'	04°31.0'
P 21	51°14.5'	04°42.5'
P 22	51°24.0'	04°52.0'
P 23	51°34.0'	04°42.0'
P 24	51°41.0'	04°31.0'
P 25	51°31.0'	04°28.0'
P 28	51°35.0'	03°53.0'
P 29	51°28.0'	03°56.0'
P 30	51°21.0'	03°56.0'
P 31	51°16.0'	03°48.0'
P 32	51°23.0'	03°40.0'
P 33	51°16.0'	03°32.0'
P 34	51°21.0'	03°23.5'
P 35	51°20.0'	04°10.0'
P 36	51°17.0'	04°15.0'
P 37	51°27.0'	04°41.0'
P 38	51°16.0'	04°25.0'
P 39	51°28.0'	04°17.0'
P 40	51°27.0'	04°06.0'