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BIOLOGICAL OCEANOGRAPHY CRUISE REPORT

LF 05/96 Part I

26 February 1996

PERSONNEL

B Stewart	(SIC), SSO, DANI
P Elliott	SO, DANI
S Bloomfield	ASO, DANI
C Gibson	SPSO, DANI
C Maggs	Lecturer, QUB
C Bradley	Student, QUB
C Guest	Student, QUB
C Hayes	Student, QUB
C Maguire	Student, QUB
R Martin	Student, QUB
E Mullan	Student, QUB
C Horner	Student, QUB

CRUISE Part I OBJECTIVES

To provide environmental science students from the Queen's University of Belfast with a demonstration of oceanographic equipment and other instrumentation and techniques associated with the Biological Oceanography cruise programme.

LF 05/96 Part II

26 - 29 February 1996

PERSONNEL

B Stewart	(SIC), SSO, DANI.
W Clarke	SSO, DANI
P Elliott	SO, DANI.
Jian Xiong	Student, State Oceanic Administration, China
J Bacheller	Res. Assist. QUB
J Guillot	Res. Assist. QUB
G Fox	Student, University College, Galway

CRUISE Part II OBJECTIVES

- i. To assess temperature, salinity and nutrient distributions over a grid of stations in the north western Irish Sea.
- ii. To recover moorings from station 38. Service moorings, attach instrumentation and redeploy at station 45 on the sampling grid
- iii. To assess nutrient release from sediment at stations 45 and 47.
- iv. To assess differences in benthic composition between an intensively trawled region of the Irish Sea and an adjacent region where trawling was restricted by the DANI instrument mooring.

1 Prof Farrell
 2 Dr Mc Murray
 This is the report of a Biol. Oc
 cruise aimed at collecting real
 & phytoplankton data together with
 physical measurements. In addition
 the moored buoys were serviced
 advantage taken to demonstrate
 work to the QUB 175c course
 environment.
 9 Jan H 4/11

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CRUISE NARRATIVE

Sunday 25 February 1996

In preparation for the mooring service in Part II of the cruise, B Stewart, W Clarke and P Elliott assembled and prepared the buoys, mooring components and water samplers onboard the RV Lough Foyle.

Monday 26 February 1996

Following a talk on ship safety and a demonstration of life saving equipment, the RV Lough Foyle departed Belfast at 1015 hrs to arrive on a suitable sampling site at the entrance of Belfast Lough at 1115 hrs. The weather was dry and overcast with only a light wind. The occasion was used to demonstrate sampling and monitoring equipment to a group of QUB students. The rosette water sampler/CTD was deployed and a plankton haul taken. On the return journey to Belfast, the shipboard analysis of samples was demonstrated. The vessel returned to dock in Belfast at 1530 hrs when C Gibson, S Bloomfield, C Maggs and the QUB students disembarked. Other DANI scientists, participating in part II of the cruise embarked at 1700 hrs and final preparations were made for the mooring recovery/deployment work. The vessel departed Belfast at 2200 hrs and sailed overnight to the mooring site.

Tuesday 27 February 1996

The ship arrived on station 38 at 0630 hrs. The weather was dry and cold with light winds. Work commenced at 0700 hrs when the Day grab was deployed to sample sediment between the mooring buoys, an area considered to be relatively free from the effects of trawl fishing. Sediment samples were also taken at a position half a mile south of the mooring site where trawl fishing is intensive. Recovery of the moorings commenced at 0800 hrs and was completed at 1030 hrs. Buoy id No. 3 was found to be slightly damaged (collision with a ship or fishing vessel is suspected) and was replaced by buoy id No. 1. As the mooring components were inspected and water samplers programmed for deployment, the box corer, mini corer and rosette water sampler/CTD were successfully deployed. Sampling completed at 1300 hrs the vessel sailed to station 45. Deployment of mooring (buoy id No. 1), with water samplers attached, commenced on station 45 at 1500 hrs and was completed at 1530 hrs on position $53^{\circ} 42' .89N$ $05^{\circ} 32' .00W$. Deployment of mooring (buoy id No. 2) commenced at 1600 hrs and was completed at 1645 hrs on position $53^{\circ} 43' .07N$ $05^{\circ} 32' .02W$. Following the successful deployment of the rosette water sampler/CTD and mini corer, work continued with the sampling schedule from station 45 at 1730 hrs in a southerly direction to stations 50 and 57 to finish for the day on station 62 at 2100 hrs. Overnight the vessel anchored close to coastal station 49.

Wednesday 28 February 1996

Work commenced on station 59 at 0700 hrs and continued in a northerly direction along a grid of stations 48, 36, 47, 36, 33, 24, 26, 21, 22 and 15 to finish on station 16 at 2000 hrs. Overnight the vessel anchored close to coastal station 14.

Thursday 29 February 1996

Work commenced on station 14 at 0655 hrs and continued in a northerly direction through station 6 to finish the sampling survey on station 4 in the North Channel at 0930 hrs. The vessel sailed to dock in Belfast at 1230 hrs where scientific and mooring equipment was dismantled and prepared for unloading. The scientific crew disembarked at 1430hrs.

Friday 1 March 1996

Unloading of scientific and mooring equipment commenced at 0930 hrs and was completed at 1230 hrs.

PARAMETERS MONITORED

The CTD/rosette water sampler was deployed at all stations on the sampling grid to acquire nutrient, chlorophyll *a*, temperature and salinity data from the depth profile. Samples were taken every 10 metres over the depth profile at stations 38, 45 and 50. Daylight permitting, Secchi disc readings were also taken at each station. For the nutrient release study, three sediment cores with overlying seawater were successfully taken at stations 38 & 47 and incubated onboard ship at seawater temperature. The box corer was also deployed at station 38 to provide additional cores for this study. Additional cores were taken at 38 and 47 and subsampled for C/N analysis. At station 38, 45 and 50, samples were taken every 10 metres for the determination of oxygen by the Winkler method. The Day grab was successfully deployed 5 times at station 38, between the mooring buoys, and again 5 times about half a mile south of the station.

SUMMARY OF RESULTS

From the acquired nutrient and CTD profile data, the survey area was generally found to be mixed from surface to bottom with typical temperature and salinity 8.4 °C and 34.70 ppt respectively; typical inorganic nitrogen values were similar to the same period last year and ranged 7 - 8.5 micromoles N l⁻¹. Significant freshwater influence was observed at stations 47, 36 and 33 in Dundalk Bay where a steep salinity gradient existed in the top 10 metres of the depth profile. Typical surface salinity 33.20 ppt and at 10 metres 34.30 ppt. Profile temperatures were also 2 - 3 °C lower than monitored at the open sea stations. Increased nutrient concentrations in this area, typical surface inorganic nitrogen 20 micromoles N l⁻¹, gave further evidence of the River Boyne influence in Dundalk Bay.

The salinity stratification observed at increasing depths at southern open sea stations 38, 45, 50, 57 and 62, in December '95, and referred to as a "salinity wedge", was no longer evident. The depth profile, however was mixed with an increased salinity of 34.85 ppt and a typical temperature 8.4 °C. This 0.45 ppt increase in salinity over the December maximum value, in a mixed water column, presents further evidence of a more saline, probably Atlantic water, entering the Irish Sea from the south and gradually mixing with the existing water column as it flows in northerly direction.

Moored McLane water sampler

The "nutrient" water sampler was programmed and deployed to sample every other day at slack tide, which ensured as much as possible, that all samples were taken at the same depth. On recovery, the sampler was found to have successfully taken 42 samples during the 3 month period of deployment. Results from samples analysed for inorganic nitrogen and orthophosphate are shown in Figure 2.

Nutrient release from sediment cores

Mr Xiong is continuing with this study on the incubated cores in the laboratory. Results show only a limited nutrient release occurring from the sediment.

ACKNOWLEDGEMENTS

I am grateful to Mr Xiong, Mr Bacheller and Ms Guillot for their help during this cruise.

The ship's master, officers, engineers, catering staff and crew are also thanked for their cooperation during this cruise.

BM Stewart

BM STEWART

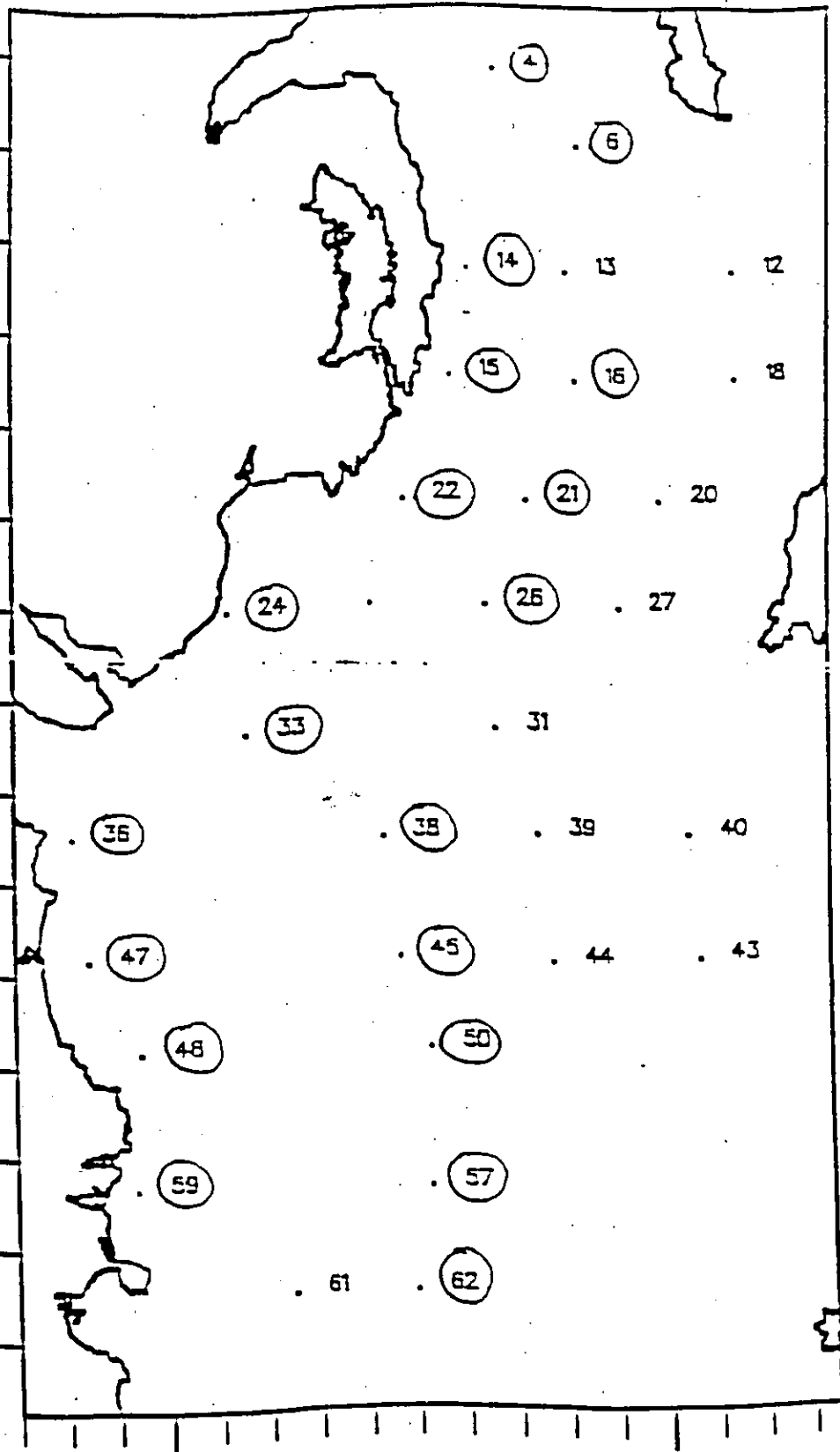
20 March 1996

DEGREES NORTH

54.5

54.0

53.5



-6

-5

DEGREES WEST

SAMPLING SCHEDULE

CRUISE LF 05/96

DATE 26 Feb - 1 March 1996. 256

BIOLOGICAL OCEANOGRAPHY CRUISE LF 05/96

Part I 26 February 1996

Part II 26 February - 1 March 1996

Part III 4 - 8 March 1996

PROPOSED WORK SCHEDULE

STATION	Lat.	Long.	Activity
Cruise Part I			
Entrance to Belfast Lough			CTD, Secchi etc.
Cruise Parts II & III			
36	53 51	06 11	CTD, Secchi
47	53 43	06 09	CTD, Secchi, corer + sediment C/N & Chl a.
48	53 37	06 03	CTD, Secchi.
59	53 28	06 03	CTD, Secchi
62	53 21	05 30	CTD, Secchi
57	53 28	05 28	CTD, Secchi
45	53 43	05 32	CTD, Secchi corer + sediment C/N & Chl a & mooring deployment
50	53 37	05 28	CTD, Secchi
38	53 51	05 34	CTD, Secchi & mooring recovery.
4	54 41	05 20	CTD, Secchi
6	54 36	05 10	CTD, Secchi
16	54 21	05 10	CTD, Secchi
21	54 13	05 16	CTD, Secchi.
26	54 06	05 21	CTD, Secchi
33	53 58	05 50	CTD, Secchi
24	54 06	05 52	CTD, Secchi
22	54 13	05 31	CTD, Secchi
15	54 21	05 25	CTD, Secchi
14	54 28	05 23	CTD, Secchi

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