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2 Prof. M.C. Murray  
This cruise is a mixture of regular + new activities. The  
stable isotope work is welcome as it will possibly provide  
insights to carbon + nitrogen fixation transfer.  
9 - on Murray 4/9

Biological Oceanography Cruise : 2001

Cruise Report  
(July 19 - August 01)

Personnel

R. Gowen (SIC)  
B. Stewart  
C Smyth  
M Trimmer (July 19-27)  
G Tilstone (July 19-28)  
L Tudor (July 19 - 24)  
M. Charlesworth (July 24-Aug 01)  
J O' Meara (July 30-Aug 01)

Cruise Objectives

- 1.- To service the DARD mooring in the western Irish Sea
2. To investigate the near surface distribution of temperature, salinity and chlorophyll in the Irish Sea
3. To investigate zooplankton abundance and species composition in relation to environmental variables in the Irish Sea.
4. To relate estimates of primary production to satellite imagery
5. To undertake a preliminary study of the distribution of stable isotopes in the plankton and benthos in different regions of the Irish Sea.
6. To investigate the distribution of heavy metals associated with suspended particulate material.

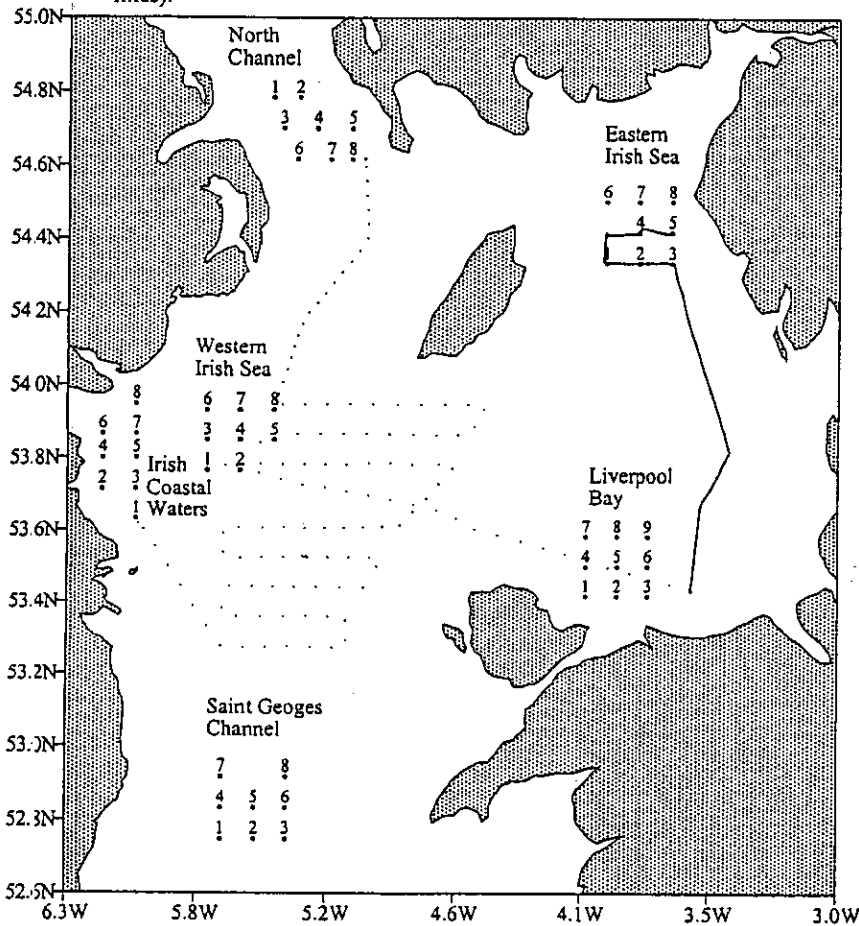
At each station a vertical profile of temperature and salinity was recorded and water samples collected from selected depths for estimation of suspended solid, particulate organic carbon and nitrogen, phytoplankton biomass and dissolved inorganic nutrients. Additional water samples were collected and preserved with acidic Lugols Iodine for determination of microplankton species composition and abundance. A zooplankton sample was collected from each station using a 0.5 m diameter net with a 200µm mesh net. At selected stations, samples of seston, zooplankton, bottom sediment and macrofauna were collected and stored frozen for later determination of stable isotopic ratios. Estimates of phytoplankton production were made at selected stations using a standard  $^{14}\text{C}$  incubation method. In association with the primary production study surface water samples were collected for measurement of coloured dissolved organic material and chlorophyll a.

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Cruise Narrative

Lough Foyle departed Belfast 0900 on Thursday July 19 and sailed for station NC1 in the North Channel (Fig 1), where work commenced at 1115. During deployment of the CTD at NC2 the hydrographic cable was found to be damaged. Repair was not possible at sea and the ship returned to Belfast where the damaged cable was removed. Lough Foyle departed Belfast at approximately 2100 and sailed for the DARD offshore mooring site. The Mooring was serviced on the morning of Friday July 20 and on completion of the service and sampling at the mooring station Lough Foyle worked a line of five stations across the western Irish sea front before sailing for Liverpool Bay. The Liverpool Bay grid of stations was completed on Saturday July 21. On Sunday July 22, work commenced at 0400 with a primary production station at station ICW8. On completion of work the offshore group of

Figure 1. A map of the Irish Sea showing the location of sampling stations and transect lines (solid and dotted lines).



stations in the offshore western Irish Sea (WIS1-8) were worked. At approximately 1900 Lough Foyle sailed for St George's Channel. The SG1-SG8 group of stations was worked on Monday July 23 before Lough Foyle sailed for Dublin, where the ship docked at 2000.

Lough Foyle departed Dublin at 2400 on Tuesday July 24 and worked stations in Irish coastal waters (ICW1- ICW8). On completion of the sampling, Lough Foyle worked a line of transects (Figure 1, dotted line) across the western Irish sea front. Near surface temperature and salinity were recorded at 1 minute intervals and near surface water samples were collected at 30 minute intervals for estimation of chlorophyll and concentrations of dissolved inorganic nutrients. Additional water samples were collected (via a hose deployed over the side of the ship) for the estimation of heavy metals in

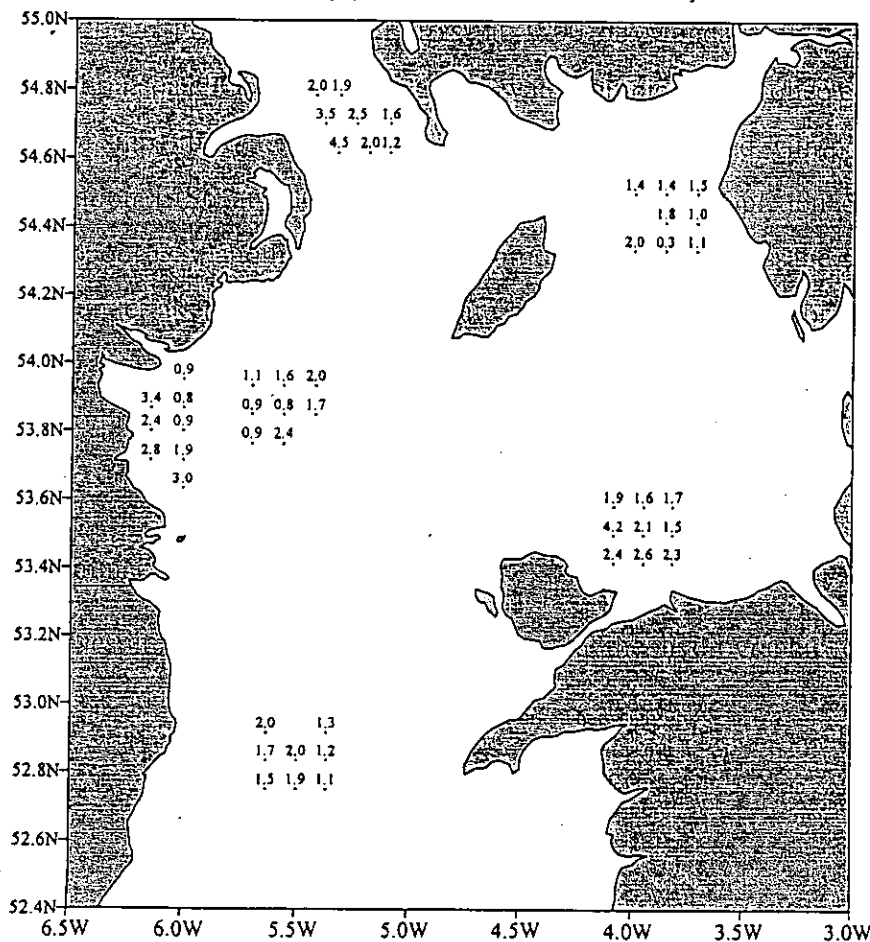
particulate material. The surface mapping exercise was completed at 2100 on Thursday July 26. Overnight Lough Foyle sailed for station NC8 in the North Channel. The North Channel grid of stations was completed before Lough Foyle sailed for Belfast where the ship docked at 1700.

Lough Foyle departed Belfast at 1900 on Monday July 30 and sailed for station EIS6 off the Cumbria coast. On route near surface water samples were collected (from a hose deployed over the side of the ship) for determination of heavy metals associated with particulate material. Work commenced at station EIS6 at 0600 on Tuesday July 31. On completion of the grid, Lough Foyle sailed into Liverpool Bay and then to the DARD mooring. During passage surface mapping (as described above) was undertaken. At the mooring site a CTD profile was recorded, water samples were collected for calibration of the moored fluorometer and a sediment sample collected for estimation of heavy metals. On completion of the sampling at the mooring site Lough Foyle returned to Belfast and docked at 1130 on Wednesday August 01.

### Preliminary Results

Despite the delay caused by repair to the hydrographic cable, all sampling was carried out

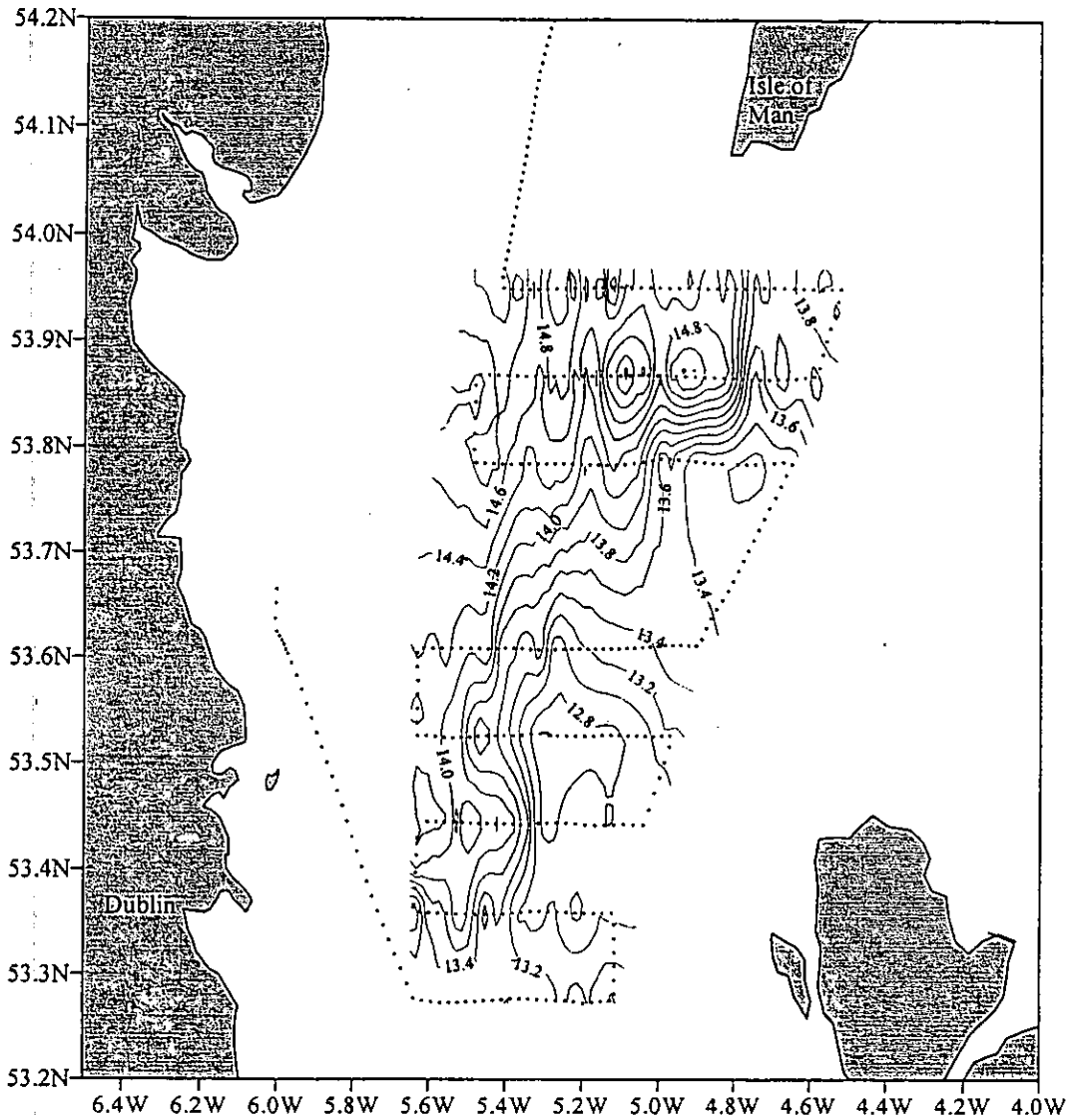
Figure 2. Surface chlorophyll at the stations worked between July 19 and 31.



successfully. The near surface concentration of chlorophyll ( $\text{mg m}^{-3}$ ) measured at each of the stations is shown in Figure 2. Concentrations in excess of  $3.0 \text{ mg m}^{-3}$  were observed in Liverpool Bay, Irish coastal waters and the North Channel. Lowest concentrations ( $< 1.0 \text{ mg m}^{-3}$ ) were measured in the western Irish Sea. The near surface distribution of temperature in the vicinity of the western Irish Sea front is shown in Figure 3. The front was well established at the time of the survey and the  $13.9^\circ \text{C}$  isotherm

marked the position of the front. The temperature difference across the front was  $\approx 1.2^\circ\text{C}$ .

Figure 3. The distribution of near surface temperature in the vicinity of the western Irish Sea front.



### Acknowledgements

I would like to thank the Captain, Officers and Crew for their assistance during the cruise.

R Gowen

September 3, 2001