Department of Agriculture and Rural Development (Northern Ireland)
Agriculture and Environmental Science Division

Cruise Report: LF 3503
Vessel: RV *Lough Foyle*
Date: 24th – 27th August 2003
Area: Irish Sea (north); ICES div. VIIa
Survey Type: Biological Oceanography & Mooring Service

Personnel:

B Stewart(SIC)	SSO	DARDNI
C Smyth	SO	DARDNI
A M Coyle	ASO	DARDNI
A Mellor	Res.Assist.	QUB

Objectives:

i. To maintain a nutrient and remote monitoring programme at mooring stations 38A and 47D.

ii. To assess temperature, salinity and nutrient distributions over depth at stations 38A and 47D.

iii. To assess bathymetry at mooring station 38A.

Cruise Narrative:

Sunday 24 August 2003
In preparation for the cruise, all DARDNI scientific crew were onboard by 2000 hrs when mooring components were prepared for deployment. In light of the increasing number of incidents in which the mooring components had been damaged, it was decided to remove instrumentation from the configuration for the foreseeable future. Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2020 hrs and sailed overnight in a light wind to station 38A mooring site.

Monday 25 August 2003
The vessel arrived on the mooring site at 0600 hrs when the weather was dry and bright with a light north-easterly breeze. As the toroid buoy of the mooring was missing, work for the day commenced at 0800 hrs by dragging the seabed to recover the ground line. The wire was located at 1030 hrs and the mooring, instrumentation

and toroid buoy eventually recovered to ship deck at 1105 hrs. It appears that the wire securing the toroid buoy to the anchor had been recovered following entanglement with fishing gear. The wire was severed some distance below the surface and in the process had become entangled in the anchor. This had the overall effect of severely shortening the connection between the buoy and anchor. As a result when the wire and anchor were released the buoy was pulled some distance under the surface.

The CTD's, fluorometers and water samplers were removed. The thermistor chain was also removed from the mooring wire, temperature data downloaded and individual units reprogrammed. Damaged mooring components were replaced where necessary and a replacement toroid buoy attached. During the ship-board service operation the side scan sonar was deployed and a survey of the sea-bed carried out to assess the bathymetry of the deployment region. The mooring was redeployed at 1700 hrs on position 53^0 46^l.88N 05^0 38^l.06W.

Following deployment of the water sampler and zooplankton net the vessel sailed to four individual stations each positioned three miles north, east, south and west of station 38a. The rosette water sampler was deployed at each station. With the last station sampled at 2105 hrs, work for the day concluded at 2130 hrs. The vessel sailed to drift overnight at station 47D.

Tuesday 26 August 2003

Work for the day commenced at 0800 hrs with a strong north-easterly wind creating less than satisfactory conditions to recover the mooring from the inshore site. Having confirmed the warning beacon working and with the absence of instrumentation on the mooring, service was deferred until the September cruise. The mooring position was confirmed 53^0 44^l.446N 06^0 03^l.967W.

Following deployment of the water sampler and zooplankton net the vessel sailed to dock in Belfast at 1610 hrs. The scientific crew disembarked at 1630 hrs.

Wednesday 27 August 2003

The scientific crew returned to the vessel when samples and equipment were removed and returned to Newforge Lane.

Parameters Monitored:

The CTD/rosette water sampler was deployed at stations 38A, 47D and the four stations positioned north, south, east and west of station 38A to acquire nutrient, chlorophyll *a*, temperature, light and salinity data from the depth profile. Three zooplankton net hauls were taken at stations 38A & 47D. The side scan sonar was deployed to survey the seabed within the mooring deployment region.

Moored Instrumentation:

The "nutrient" water sampler located at depth 17 metres functioned as programmed. Duplicate samples, for nutrient analysis, were taken every second day during the period

31 July – 24 August 2003. A second "large volume" water sampler located at 19 metres also functioned as programmed sampling daily during the period 29 July – 24 August 2003. Temperature data recorded at 3 hourly intervals was recovered from seven thermistors positioned at intervals throughout the water column.

Temperature, salinity and fluorescence data recorded at 15 minute intervals was recovered from CTD's positioned near surface and near bottom at station 38A.

Summary of Results:

The CTD data from station 38A shows a reduction in stratification compared to the profile recorded during the July survey. A 3.8 ^{0} C difference between the surface and bottom layers in July has been reduced to 2.2 ^{0} C. With the prolonged spell of good weather, surface temperatures have remained constant. As a result the reduction in stratification is mainly due to heat transfer mixing down to the lower layers. Despite this evidence of mixing, nutrient concentrations throughout the profile remain similar to values recorded in July. Similar profiles were observed at four stations sampled three miles north, south, east and west of 38A, demonstrating uniformity of temperature, salinity and nutrient distribution throughout the gyre region. The results from the side scan sonar survey showed the area in the vicinity of the mooring to be relatively even with no evidence of sharp rises in the seabed.

The in-shore shallower station 47D exhibits a similar stratified profile. While the temperature differential between surface and bottom, 2.2 ^{0} C, had remained constant since the July survey both surface and bottom temperatures had increased by 2.2 ^{0} C. An enhanced fluorescence signal recorded throughout the profile at this site was accompanied by nutrient levels depleted beyond values recorded at the offshore site. This shallow station permits light penetration to promote biological activity throughout the profile, which in turn results in nutrient uptake, particularly nitrate and nitrite.

Hotel Report & Operational Aspects of the Ship:

During the cruise the A-frame, main trawl winches, both hydrographic winches and the ship's clean seawater supply were used. No problems were encountered with any of the ship's equipment nor indeed with any of the scientific equipment. The hotel and catering service was of the usual high standard and there was a good working relationship between the scientists and the ship's crew. Prior to the ship departing Belfast a comprehensive and detailed safety briefing was delivered to the scientific crew.

Acknowledgements:

I am indebted the deck crew of the RV Lough Foyle for their co-operation and assistance, particularly during the mooring recovery and deployment operation. The ship's master, officers, engineers and catering staff are also thanked for their co-operation during this cruise.

B M STEWART

23 September 2003