

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

**Cruise Report:** LF 4704

**Vessel:** RV *Lough Foyle*

**Date:** 15<sup>th</sup> – 19<sup>th</sup> November 2004

**Area:** Irish Sea (north); ICES div. VIIa

**Survey Type:** Biological Oceanography & Mooring Service

**Personnel:**

B Stewart (SIC)	SSO	DARDNI
P McShane	ASO	DARDNI
J Hill	Student	QMUL
A Mitchell	RA	QUB
K Howell		JNCC

**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 sediment, epifauna and *Nephrops* samples for isotopic and pigment Content.
- iv. To assess seabed type from a camera survey off the eastern Isle of Man coast

**Cruise Narrative:**

Sunday 14 November 2004

In preparation for the cruise, all DARDNI scientific crew were onboard by 2000 hrs. Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2015 hrs and sailed overnight in a strong westerly wind.

Monday 15 November 2004

With the persistent strong westerly wind it was decided to initially service the mooring at the in-shore site. The vessel arrived on the mooring site at 0600 hrs. The weather was dry with a fresh westerly breeze when work commenced at 0800 hrs. The instrument mooring was readily recovered to ship deck at 0815 hrs. Following a

thorough service the mooring was redeployed at 0920 hrs in depth 24.4m on position  $53^{\circ} 44^{\prime} .557\text{N } 06^{\circ} 03^{\prime} .920\text{W}$ . Following deployment of the rosette water sampler and zooplankton net the vessel sailed to the off-shore mooring site. The strong westerly winds had begun to subside when the vessel arrived on the mooring site at 1300hrs, with the complete instrument mooring eventually recovered to ship deck at 1345 hrs. The mooring components were serviced, instruments downloaded and reprogrammed before redeployment at 1640 hrs in depth 90m on position  $53^{\circ} 46^{\prime} .789\text{N } 05^{\circ} 38^{\prime} .145\text{W}$ . Following this the rosette water sampler and zooplankton net were then deployed. Work for the day finished at 2000hrs with the vessel drifting overnight at the off-shore mooring site.

#### Tuesday 16 November 2004

Work for the day started on the mooring site at 0800 hrs with the deployment of the rosette water sampler followed by the sediment multi-corer, Gulf III and beam trawl to acquire water, sediment, epifauna and *Nephrops* samples. The vessel sailed to the seabed survey site off the eastern coast of the Isle of Man where the Day grab was deployed. A RoxAnne survey of the area was attempted but eventually abandoned owing to the rough sea state

#### Wednesday 17 November & Thursday 18 November 2004

Both days were spent sampling the seabed during daylight hours and running RoxAnne overnight.

#### Friday 19 November 2004

The vessel sailed to dock in Belfast at 0815hrs when the scientific crew prepared equipment for transportation to Newforge. All scientists disembarked at 1100hrs.

#### **Parameters Monitored:**

The CTD/rosette water sampler was deployed at stations 38A, 47D to acquire nutrient, chlorophyll *a*, temperature, light and salinity data from the depth profile. Three zooplankton net hauls were taken at stations 38A & 47D.

#### **Moored Instrumentation:**

The McLane water sampler deployed at depth 20 metres functioned as programmed with the exception of the period 21 January to 28 February. During that period the sampler was lost from the mooring following a collision with an unknown vessel. The mooring was repaired and sampler replaced during the February NMMP cruise (CO 09 2005; SIC Dr. M Service). Aside this, duplicate samples, for nutrient analysis, were taken every second day during the reporting period 15 Nov' 2004 – 30 May 2005. Temperature data recorded at 3 hourly intervals was recovered during each mooring service from seven thermistors positioned at intervals throughout the water column.

Temperature, salinity and fluorescence data recorded at 15 minute intervals was recovered during each mooring service from CTD's positioned at near surface and

near bottom at station 38A. Currently no instruments are deployed on the station 47D mooring.

## **Summary of Results:**

### Biological Oceanography: Station 38A

Data from the survey cruises during the period 15 November 2004 – 1 June 2005 demonstrate the changing cycle from the demise of the thermocline reported in September 2004 through to the period of the spring bloom in April/May 2005. Nutrient profiles from November, January and February show a steady increase in nutrient concentrations throughout the profile, typically from 4.5 to 7.5 micromoles inorg N l<sup>-1</sup>. High-resolution nutrient data from the moored water sampler support this observation and identifies the winter “max” as occurring in mid March, almost four weeks earlier than last year. During April the surface layers of the water column are gradually depleted of nutrients as they fuel the spring bloom. Increased chlorophyll levels in these layers, typically 6 – 9 micrograms chlorophyll l<sup>-1</sup>, show evidence of the increase in biomass. Further depletion of the water column continues throughout May as up-welled nutrients are taken up during the spring bloom. CTD profiles from November January and February are isothermal and show gradual loss of 5 °C over the winter months. April’s profile indicates the first sign of surface warming and is followed in early May by the development of a weak thermocline which is further strengthened towards the end of May. High-resolution temperature data from the moored surface and bottom thermistors show surface warming beginning in mid March. This coincides with the onset of nutrient depletion of the upper layers and the initiation of the 2005 spring bloom.

### Biological Oceanography: Station 47D

An often-complex situation arises at this inshore station owing to the direct freshwater influence from the River Boyne. However during the survey period the pattern was similar to what occurred offshore. CTD profiles for November, January and February are generally mixed and show a gradual loss of 4.5 °C over the winter months with temperatures 1 – 2 °C below those recorded at the off shore site. Nutrient values during this period show a sharp increase from typically 5 to almost 9 micromoles inorg N l<sup>-1</sup>. CTD profile data from April, early and late May are mixed and show progressive warming. Nutrient data for this period show some nutrient depletion in April with a residual 3 – 5 micromoles inorg N l<sup>-1</sup> in the water column with almost total depletion of inorg N occurring during May. This is a similar pattern to what occurred off shore and despite the absence high-resolution data from moored instrumentation at this site it indicates a similarity in the timing of the spring bloom.

## **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 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 to the deck crew of the RV Lough Foyle for their co-operation and assistance during the mooring recovery and deployment operations. The ship's master, officers, engineers and catering staff are also thanked for their co-operation during these cruises.

**B M STEWART**

28 July 2005