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

**Cruise Report:** LF 3104
**Vessel:** RV *Lough Foyle*
**Date:** 1st – 4th August 2004
**Area**: Irish Sea (north); ICES div. VIIa
**Survey Type**: Biological Oceanography & Mooring Service

**Personnel:**

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|---|---|---|
| B Stewart (SIC) | SSO | DARDNI |
| P McShane | ASO | DARDNI |
| J Hill | Student | QMUL |
| K Kennington | Port Erin | IOM |
| T Shammon | Port Erin | IOM |

**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 surface temperature, salinity and nutrient distributions throughout a grid of stations in the north western Irish Sea.

iv. To assess sediment, epifauna and *Nephrops* samples for isotopic and pigment content.

v. To assess temperature, salinity and nutrient distributions over depth along an east-west Irish Sea transect at latitude 54 degrees.

**Cruise Narrative:**

Sunday 1 August 2004
In preparation for the cruise, all DANI scientific crew were onboard by 2000 hrs when mooring components and the automated sampler were prepared for deployment. Following a talk on ship's safety and a demonstration of personal life saving equipment, the RV Lough Foyle departed Belfast at 2100 hrs and sailed overnight in a light southerly breeze towards the mooring site at station 38A.

Monday 2 August 2004
The vessel arrived on the mooring site at 0600 hrs. The weather was dry with a fresh westerly wind when work for the day started at 0700 hrs with the complete instrument mooring eventually recovered to ship deck at 0700 hrs. The mooring components were serviced, instruments downloaded and reprogrammed before redeployment at 1300 hrs in depth 91m on position $53^0$ $46^l$.892N $05^0$ $38^l$.114W. The rosette water sampler and zooplankton net were then deployed. After lunch the rosette water sampler was again deployed, followed by the sediment multi-corer and the beam trawl to acquire water, sediment, epifauna and *Nephrops* samples. The vessel then sailed to inshore mooring station 47D where the vessel drifted overnight in proximity to the mooring station

Tuesday 3 August 2004
Work for the day commenced at 0700 hrs when the instrument mooring was recovered to ship deck at 0800 hrs. Following a thorough service the mooring was redeployed at 0850 hrs in depth 26 m on position $53^0$ $44^l$.412N $06^0$ $04^l$.008W. The vessel then sailed towards the Strangford coast to commence sampling along the 54 degree latitude line. Work along the transect stations commenced at 1030 hrs when the rosette water sampler was deployed at approximately hourly intervals finishing in Morecambe Bay at 2245 hrs. The vessel then sailed overnight to dock in Belfast at 0900 hrs next day.

Wednesday 4 August 2004
Work for the day commenced at 0800 hrs when samples and equipment were prepared and removed from the vessel for return transportation to Newforge Lane.
The scientific crew disembarked at 1000 hrs.

**Parameters Monitored:**
The CTD/rosette water sampler was deployed at stations 38A, 47D and at positions along the 54 degree latitude transect from Strangford to Morecambe Bay 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 mini corer, Gulf III and beam trawl were deployed at station 38A to acquire sediment, epifauna and *Nephrops* samples respectively.

**Moored Instrumentation:**
The McLane water sampler deployed at depth 20 metres functioned as programmed with duplicate samples, for nutrient analysis taken every second day during the period 2 August – 24 September 2004. A second sampler deployed at depth 23 metres functioned as programmed with daily plankton samples taken during the same period.

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:**

Station 38A

CTD data from the August survey cruise shows a weakening of the thermocline compared to what was observed in July. This partial mixing of the upper and lower layer interface has occurred 4-5 weeks earlier than last year and may be explained by a prolonged windy period at that time. Further evidence of mixing at the interface is demonstrated by nutrient data where nutrient depletion extends to 21.5 m in August but during July extended to 30.5 m. This gradual mixing of the deeper concentrated nutrient layer with the depleted upper layers is the first stage of nutrient recovery throughout the profile. This is reflected in nutrient data from the moored sampler where nutrient concentrations begin to recover from the beginning of September. CTD data from the September survey show a thoroughly mixed profile with salinity and temperature 34.2 and 13.9 $^{o}$C respectively. Also temperature data from the thermistors now show similar values for near surface and near bottom. Complete mixing has occurred several weeks earlier than previous years, but again this is due to prolonged strong winds during September. These physical observations are supported by nutrient data across the profile and again reflect mixing, with top to bottom inorganic nitrogen concentrations typically 2.5 micromoles inorg N $l^{-1}$.

Station 47D

An often complex situation arises at this inshore station owing to the direct freshwater influence from the River Boyne. However for August and September the pattern is similar to what occurred offshore. The CTD profile for 2 August shows a strong thermocline at 13 metres but a salinity value of 34.1 demonstrates minimal frewhwater influence from the River Boyne. Similar to the offshore site nutrient depletion is associated with the upper layer. Data from the September cruise show complete mixing with temperature and salinity typically 13.7 $^{o}$C and 34.2 and inorganic nitrogen concentrations typically 2.8 micromoles inorg N $l^{-1}$. As salinity has remained constant and relatively high for this area since the August survey it is likely that nutrient recovery is a result of remineralisation rather than input from the River Boyne.

**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 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**