

DEPARTMENT OF AGRICULTURE (NI)

CRUISE REPORT - RV LOUGH FOYLE - LF/19/89

CELTIC SEA HERRING ACOUSTIC ASSESSMENT 4th-19 October 1989

**PERSONNEL:**

R. Briggs DANI (12th-19th Oct)  
D. James DANI (12th-19th Oct)  
W. McCurdy DANI (4th-11th Oct)  
J. Peel DANI (4th-11th Oct)  
D. Minchin DOM  
D. Kennedy DOM  
R. Nash PEML (Acoustics Consultant)  
P. Fernandes PEML

**OBJECTIVES:**

To perform a hydroacoustic survey of the Celtic Sea autumn spawning herring stocks.

**METHODS:**

A survey strategy based upon a restricted randomised design was adopted, covering the area from the Tuskar Rock ( $52^{\circ}10'N$   $06^{\circ}10'W$ ) to Loop Head ( $52^{\circ}05'N$ ,  $10^{\circ}30'W$ ) around the Irish coast (Figure 1). A 38kHz echosounder with a transducer located in a towed body was employed throughout the survey. Raw analogue data were stored on VHS video cassettes and the transformed digital data were transferred to magnetic computer tapes during the cruise for future analysis. Ground truth data were collected using midwater trawl gear. Fish species in catches were quantified and samples of the herring component were individually weighed, measured, otoliths removed for ageing and vertebrae counted to distinguish the autumn and winter spawning proportions. All scientific work was performed over 24hrs of each day, where conditions allowed, with personnel operating a shift system.

**NARRATIVE:**

Messrs. McCurdy, Peel, Kennedy and Dr Minchin joined the Lough Foyle in Belfast on 3rd October. The vessel left Belfast on 4th October at 08:00h and arrived in Douglas,

Isle of Man at 15:30h where Dr Nash and Mr Fernandes joined. The Lough Foyle left Douglas at 17:00h. and steamed south to the survey area, arriving off Cahore Point at 07:00h on 5th October. Poor weather (SE 8) during the night moderated (NW 4/5) and acoustic data collection commenced the following morning at 10:32h. Power loss on the net drum occurred during hauling the first tow and the ship steamed to Dublin for net drum repairs arriving at 08:30h on 6th October. A new hydraulic pump was fitted to the net drum motor. At this time temporary repairs to part of the "Microplot" system and the "Shipmate" navigation receiver were also carried out. Arrangements were made to have permanent repairs made to both of these and "Roxann" during the planned refueling break in Cork on 11th/12th October.

The vessel left Dublin at 20:15h and arrived off Wexford at 04:36h on 7th October. Acoustic data collection recommenced at 06:45h in moderate seas and swell (wind NW 4/5). At the beginning of transect 6, the signal from the transducer was lost. The cause of the signal failure was found to be a break in the outer sheath of the cable. This was repaired and acoustic data collection recommenced at 18:42h in freshening weather (WNW 6). Improved weather conditions during the remainder of the cruise, enabled the survey to continue as planned. Data collection ceased at 08:30h on 11th October and the ship docked in Cork at 11:00h, where repairs to the Shipmate navigation system and associated scientific equipment were carried out.

Dr Briggs and Mr James (DANI) joined the ship in Cork at 18:00h on 11th October and Messrs. McCurdy and Peel returned to Coleraine. The Lough Foyle put to sea for the second half of the cruise at 13:30h on Thursday 12th October, steaming west and then north through the first night. Despite deteriorating weather conditions echosounding commenced off Loop Head (Figure 1) at 09:00h on Friday 13th October. Damage to the transducer cable and poor weather (SW 6-8) caused some delay and the night of 13th October was spent dodging off the Shannon estuary, while repairs were carried out. Despite further time loss due to damage to one of the vessel's two trawl nets and bad weather (SW gales), all major transects planned for the western coastal waters were completed by Tuesday 17th October. Improved weather conditions allowed good time to be made and the the remaining south coast transects were completed by 19th October. During this cruise over 140 acoustic transects and 10 ground truth trawls were performed. The Lough Foyle docked in Cork at 11:20h on Thursday 19 October.

#### RESULTS:

Apart from '0' group herring north of Tuskar no herring were encountered on SE coast, although pilchard, sprat, mackerel and scad were present. Winter spawning herring were sampled off Oysterhaven, where commercial vessels were seen fishing.

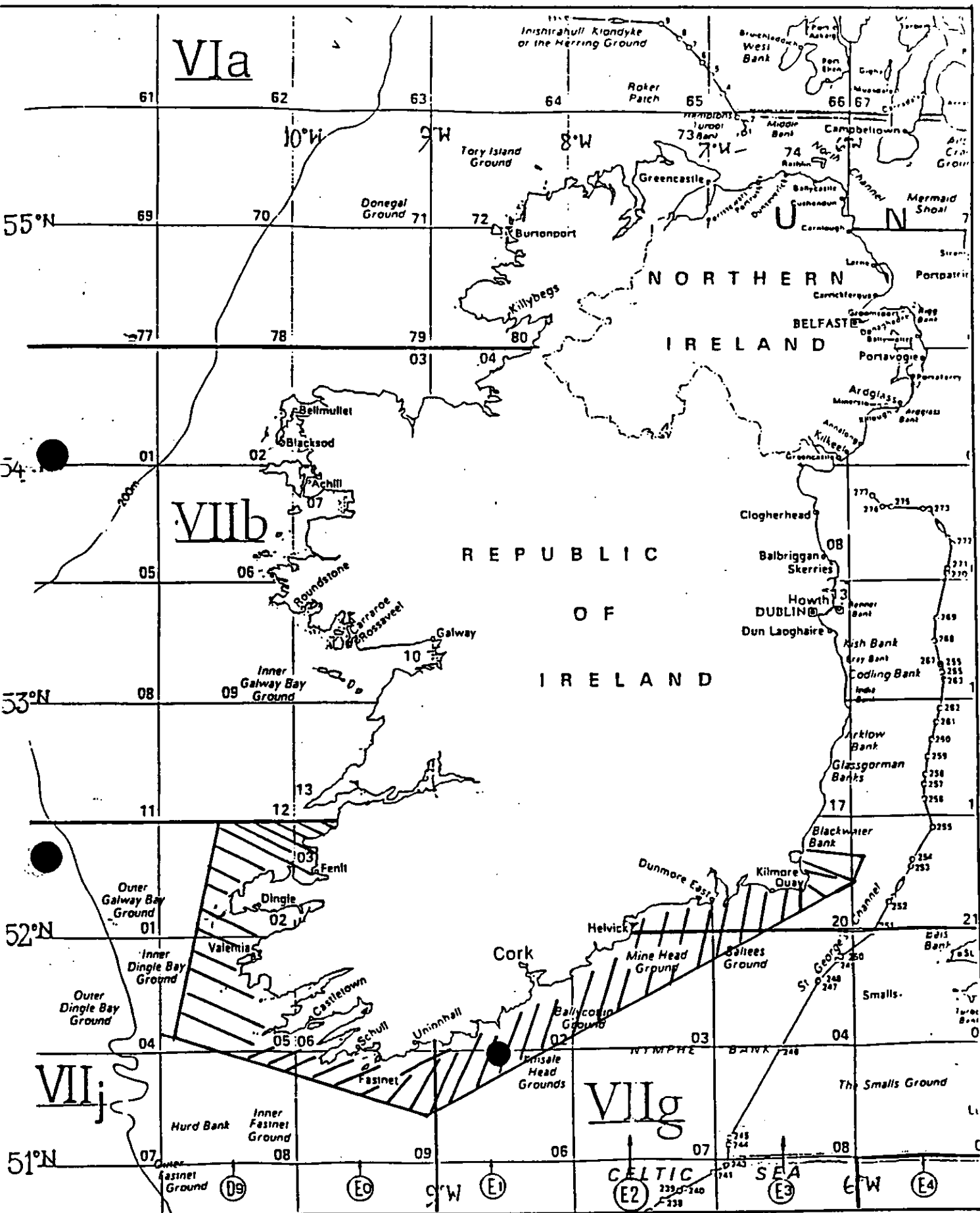
Sea temperatures at this locality were 14.7-14.8°C and further offshore 15.1°C. Herring were sounded off Kerry Head over rocky ground, but throughout the rest of the cruise there were only scattered marks apart from dense schooling 5nm ESE of the Old Head of Kinsale. This concentration was sampled and contained both autumn and winter spawners. Most other marks on the SW coast appeared to be sprat and other species.

R.P. Briggs  
19 October 1989

cc Dr D. Minchin  
Dr R. Nash  
Capt. A. Niblock

Map of Ireland showing survey area (hatched)

Region of high herring concentration



ACOUSTIC ASSESSMENT OF HERRING IN THE CELTIC SEA (AREA VIIj) -  
OCTOBER 1989.

A survey of herring stocks on the south and south-west coast of Ireland was undertaken between 5th and 19th October 1989 off RV *Lough Foyle*. Acoustic assessment utilised a SIMRAD EY200 38 kHz echosounder. Data were integrated directly onto computer and back-up raw signals were stored on video tape (digital format). Analyses of data will be undertaken by the end of December 1989. The general survey design used a rectangular grid pattern perpendicular to the coastline. This pattern was utilised on the south and lower south-west coast. The more northerly areas between Loop Head and Bantry Bay used a 'V' or parallel transect design in to and out of the bays, due to adverse weather conditions. Survey lines extended up to 17 nautical miles off shore and varied in spacing from 0.5 to 5 nautical miles. The depth range for survey transects was between 23 and 98 m, generally inshore turns were at about the 30 m contour, however, the exact location or depth depended on the local topography and weather conditions. In some areas transects were repeated during day and night to determine day/night differences. The area around Old Head of Kinsale was covered both on the 11th and 19th October to determine the difference in assessment over a week period. 'Ground-truthing' of the acoustics was undertaken with a mid-water trawl where necessary.

Herring schools were seen at a number of locations within the survey area but overall the numbers of schools and potential quantity of fish was disappointingly low. Herring schools were noted around Greenore Point (to the north and around to Waterford Harbour). Herring also occurred in the area to the east and west of Cork in the area delimited by John Malloy for the ICES Herring Assessment Working Group (1989). Using approximate values, the integration suggests a maximum density of herring in some fish schools as  $1.7 \text{ fish m}^{-3}$ . There were very few herring marks west of Old Head of Kinsale until north of Bantry Bay where schools appeared to be either in open bays eg Ballinskelligs Bay and confined south of Loop Head. In general, herring schools occurred between 30 and 60 m depth, tending to be slightly deeper during the daylight hours. The repeat transects during the day and night indicated that a lack of herring schools during day was also repeated during night. Therefore there does not appear to be a problem with some areas being covered during the day and some at night. This should be checked further at some later date. There is the possibility that some herring may have occurred shallower than the inshore extension of the transects, some small schools which could possibly have been herring were noted. These schools could not be sampled with the *Lough Foyle* due to the shallowness of the water, very changeable depth profile and the proximity of the coastline. There is also the possibility that some fish occurred further offshore but the extent of this offshore extension would add a major increase in survey time and concept. Trawl samples gave us the sizes of herring present and overall species composition in the survey area.

The survey was successful as a first attempt at these stocks. A number of questions have arisen from this work. There is a problem in the eastern area due the presence of pilchard. This species behaves and appears on echosounder traces as very similar to herring. Detailed sampling is the only method of

separating them to avoid error in echo-integration results. There were large numbers of sprat in the area. The samples taken give us a fairly good indicator of classic sprat echogram marks so there should not be much of a problem in removing sprat from the assessment of herring. However, there is the possibility of confusion between small herring schools and sprat.

#### Problems encountered and recommendations

In general the survey went well with the weather proving to be a major obstacle especially on the west coast. Adverse weather conditions took its toll on some of the equipment, especially transducer cables. Similarly the weather did not give an opportunity to undertake a calibration of the system. This will need to be done as soon as possible.

The lack of a navigational information direct to the echosounder and Microplot system in the *Lough Foyle* laboratory created a lot of extra work for research personnel. This was fixed in mid-cruise in Cork. It is very useful to have this facility for this kind of work and should be recommended as up and running for future cruises. It should be noted that on the west coast, close inshore, near Dingle Bay, DECCA aerials mounted low on the superstructure are subject to considerable shadowing and therefore positional error.

The crew did a very good job with mid-water trawling, however, there are problems with the system on the *Lough Foyle*. Due to the areas which need to be sampled very often being over rough ground and fairly shallow it is imperative that there is a working sonar. This will facilitate the location of fish schools as well as indicate the presence and location of major changes in topography well in advance of a trawl. The consequence will be a reduction in risk of damaging the trawl and make fishing on targeted schools more efficient. The net drum was relatively slow and on a number of occasions appeared to have problems recovering the equipment. This factor added time to the collection of samples. The presence of a cod-end sensor may have given a better indication of fish in the net so as not to waste time in obtaining samples. To undertake this work (assessments of herring) it would be very useful for these points to be examined carefully.

Before undertaking another assessment cruise it would be useful for all parties concerned to communicate on what equipment and facilities will be provided by each party. We are in a position to determine exactly what needs to be done and what is needed to make these cruises run smoothly.

Richard D.M. Nash  
Port Erin Marine Laboratory.

R.D.M. Nash

RV "Lough Foyle"

4th October 1989.

0758 depart Belfast

1523 all fast No2 berth Victoria Pier I.O.M.

1702 depart berth.

5th October 1989.

1930 hours 52°20'N 006°00'W vessel proceeding to Dublin, net drum failure

6th October 1989

0758 Dublin pilot boards.

0826 vessel alongside.

1957 let go. 2014 pilot away.

11th October 1989.

1101 vessel alongside Tivoli Quay...Cork.

12th October 1989.

Irish Marine Offshore Electronics on board.

1342 let go. 1432 Pilot away.

14th October 1989.

1035 vessel anchored in Brandon Bay..weather.

1835 anchor aweigh.

19th October 1989.

Enter Cork 1008 pilot boards. 1120 all fast Andersons Quay.

23rd October 1989.

Depart Cork 1545 pilot on board 1551 let go. 1651 pilot away.

24th October 1989.

2050 vessel anchored Brandon Bay..weather.

25th October 1989.

1005 depart Brandon Bay, proceeding to Galway to land John Molloy.

1956 anchored off Galway..John Molloy landed..2038 anchor aweigh.

27th October 1989

1345 anchored in Cork Harbour

28th October 1989

2001/2034 shift ship to Spit Bank anchorage.

29th October 1989

0627 anchor aweigh..proceeding to sea.

30th October 1989

Arrive Dublin 1635 pilot on board 1711 vessel alongside. Land DOM staff

2100 let go. 2115 pilot away.

31st October 1989

Arrive Belfast 0800 N01 Buoy 0858 all fast.