**CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE LOWESTOFT LABORATORY, SUFFOLK, NR33 0HT**

**2008 RESEARCH VESSEL PROGRAMME**

**REPORT: RV CEFAS ENDEAVOUR: CRUISE 2/08.**

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**DURATION:** 24 January - 7 February 2008

**LOCATION:** Irish Sea

**AIMS:**

1. To conduct a plankton survey using a 76cm Gulf VII plankton sampler to determine the distribution and abundance of cod (*Gadus morhua*), haddock (*Melanogrammus aeglifinus*) and plaice (*Pleuronectes platessa*) eggs.
2. To remove fish eggs from fresh plankton samples at sea. To measure, stage and preserve these eggs individually, in ethanol prior to species identification using a DNA technique on return to the laboratory.
3. To sample adult plaice, cod and haddock for the estimation of fecundity and atresia using a semi-pelagic trawl.
4. To collect surface nutrient and salinity samples at each of the sampling stations.
5. To collect surface chlorophyl samples every five sampling stations.
6. To collect supplementary sub-surface environmental data using a self-logging package carried on the Gulf VII plankton samplers.
7. To collect fine mesh (80 micron) PUP net samples for subsequent zooplankton analysis on every Gulf VII deployment.
8. To continuously log sub-surface (3m) salinity, temperature and fluorometry data using the ships pumped seawater supply and onboard CTD.
9. To study the distribution and ecology of jellyfish throughout the Irish Sea. M. Lilley (Swansea University)

**NARRATIVE:**

RV CEFAS ENDEAVOUR sailed from Lowestoft at 11:00h 25 January and made good progress, steaming west down the English Channel, in moderate SW winds. Regular, two

hourly sampling, was initiated at 14:30h, with samples of sub-surface seawater being taken from the ships clean seawater supply (which was continuously logged, aim 8) for subsequent nutrient, chlorophyll 'a' and salinity analysis back at the laboratory (contract AE004). The following day, a 1m diameter, 500μm mesh, vertically hauled, ring net (aim 9) and a Niskin bottle, sampling near bottom water, were deployed at each of three NMMP stations at Selsey Bill (stn 10), in the central English Channel (stn 16) and off Plymouth (stn 20) (Fig 1). On 27 January the wind had eased to allow ring net and Niskin bottle deployments off Bishops Rock, west of the Scillies (stn 24) and at two further NMMP stations in the Celtic Deep (stn 32) and off Cardigan Bay (stn36).

Plankton sampling with the Gulf VII (aim 1) began at 03:55h 28 January, at 53º 15'N, 04º 50'W (Fig 2, Stn 39). The two hourly water sampling was suspended at that time, in favour of water sampling at every plankton station (aims 4 and 5). The plankton sampler was equipped with a self-logging environmental package (ESM2 logger) and a fine, 80μm mesh, 'Pup' sampler, which collected supplementary environmental data and biological samples at each station (aims 6 and 7).

Following each plankton station, fish eggs were removed from the fresh sample, then measured and staged. If the eggs were the required size and stage, they were individually preserved in ethanol for subsequent species identification using a DNA technique, back at the laboratory (aim 2).

Plankton sampling continued, heading north, on short east–west transects in the central Irish Sea. A further ring net and Niskin bottle deployment (Stn 48) were completed at a NMMP station north of Anglesey during the afternoon of 28 January before all 15 plankton stations in strata box B were completed by early morning of 29 January. Sampling continued on the west side of the Isle of Man to the northern-most line of stations at 53º 35'N. Good progress was made down the Irish coast until a Portuguese High Headline Trawl (PHHT) was deployed in Dundrum Bay at midday on 30 January. The catch was very light (mainly sprat) and no fecundity samples were taken.

Plankton sampling resumed in increasing SW winds working south, on short east-west transects, down the Irish coast. Continuing problems with the Valeport CTD and software forced the complete replacement of deck and underwater units during the evening but only one more plankton station was completed before the strengthening winds forced work to cease at 23:30h 30 January.

Work resumed at 11:00h the following morning on the most inshore stations, despite SW winds exceeding 45Kts. Six stations were completed before the wind increased still further forcing ENDEAVOUR to seek shelter north of Dublin at 20:00h. Sampling resumed once more at 04:30h 1 February in marginal conditions, but the final station in strata box A was completed at 20:00h. ENDEAVOUR then steamed NE, to begin sampling in the eastern Irish Sea, SE of the Isle of Man at 03:30 2 February. Only five stations were completed when southerly force 9 winds caused the ENDEAVOUR to head for shelter off the N Wales coast. Three more plankton stations were completed *en-route*. Further problems with the Valeport CTD's and software resulted in the second underwater being replaced with the final spare, before two further stations were completed off the coast of Anglesey by 23:00, when winds of over 50Kts prevented any further work.

More Valeport problems delayed sampling by two hours the next morning, but sampling eventually resumed at 07:30h, 3 February in marginal conditions (S'ly 8-9 gales). However, good progress was made along the Welsh and English coasts and all stations were completed in strata box E by 13:30, 4 February. ENDEAVOUR then steamed to a trawling position in Colwyn Bay in an attempt to collect plaice fecundity samples. Unfortunately a 30-minute tow only produced a damaged trawl with the cod end and liner being badly torn. Whilst the net was being repaired, ENDEAVOUR steamed to a second trawling position in Red Wharf Bay. Another 30 minute tow at 20:00h produced a light catch of small fish with six fecundity samples being collected. The ship then dodged overnight in the shelter of Red Wharf Bay in a SW severe gale 9.

The winds began to decrease at midday, 5 February, and ENDEAVOUR set course for the final NMMP site south-east of the Isle of Man at 12:30h, where both the 1m ring net and 10 litre Niskin bottle (Stn 134) were deployed. Gulf VII sampling resumed at 18:30h, working north off the Cumbrian coast, in moderating seas, until 09:00h the next day. The Valeport CTD failed once again before the penultimate station and coupled with a request to leave the area from the local firing range, ENDEAVOUR, steamed to a trawl position south of St. Bees Head. One PHHT deployment at this site produced nine plaice fecundity samples and two further trawls just north of St. Bees Head resulted in a further 10 samples being collected. The final two Gulf VII deployments were completed in the mouth of the Solway Estuary at 17:45h and ENDEAVOUR then made passage to Belfast where staff and equipment were to be exchanged for the following cruises. ENDEAVOUR docked in Belfast at 08:30h, 7 February 2008.

**RESULTS:**

Aims 1 & 7:

A Gulf VII plankton sampler, fitted with a 40cm aperture nosecone and 270μm mesh net was used during this survey, with an auxiliary 80μm mesh 'Pup' net attached. A Valeport CTD mounted on the sampler, provided 'real time' flow-meter data as well as salinity and temperature profiles for each double oblique plankton haul. 105 plankton stations were completed, covering the whole Irish Sea from 53º 00'N to 55º 00'N (Figure 1), with both 270μm and 80μm samples being collected on each station. The Valeport CTD system caused numerous problems throughout the survey, with valuable time being lost on almost every deployment. These problems MUST be overcome before the following surveys on the Celtic Voyager during March and April this year.

Aim 2:

The 270μm net samples were examined whilst still fresh at sea. Fish eggs in early development stages and between 1.1 and 1.75mm diameter were removed and individually preserved in ethanol. A total of 572 eggs were obtained during this cruise, for subsequent species identification using a DNA technique.

Aim 3:

A Portuguese High Headline Trawl (PHHT) was used on six occasions to provide samples of mature female plaice for fecundity estimations. The trawl, which was towed for 30 minutes in areas of high egg abundance, was fitted with a tickler chain and fine mesh liner. The trawl in Dundrum Bay produced a very small catch, which was predominantly sprat. The second trawl in Colwyn Bay was damaged. A subsequent trawl haul in Red Wharf Bay resulted in

six fecundity samples of plaice being collected. Three further trawls in the vicinity of St Bees Head produced a further 19 samples of ovary tissue.

Aims 4, 5 and 8:

The sub-surface (3m) thermo-salinograph was run throughout this survey and was continuously logged to the shipboard computer. Unfortunately no positional data was available for logging directly to the environmental data file. Approximately 140 discrete sub-surface seawater samples were taken from this sub-surface supply every two hours *en-route* to the Irish Sea and at every plankton station. These samples were collected for subsequent nutrient, salinity and chlorophyll analysis back at the laboratory.

Aim 6:

A new ESM2 environmental data logging package was mounted on the plankton sampler for most deployments. It provided an environmental data back-up to the Valeport CTD and will enable some cross-calibration of both systems. It also recorded a wide range of environmental parameters (temperature, salinity, fluorescence, oxygen, turbidity and light) together with some information on Gulf VII performance (pitch and roll). The system performed extremely well and may be utilised on more of the Irish Sea egg surveys later in the year.

Aim 9:

A 500μm mesh, 1m diameter ring net was deployed at each of the eight NMMP sites visited. The samples were analysed aboard but no jellyfish were found. This was not entirely unexpected at this time of year. A 10 litre Niskin bottle was also deployed at each of the NMMP positions and samples were taken for subsequent analysis of nutrients, chlorophyll and salinity.

Fig 1. Cefas Endeavour 2/08
Niskin bottle and ring net station positions.

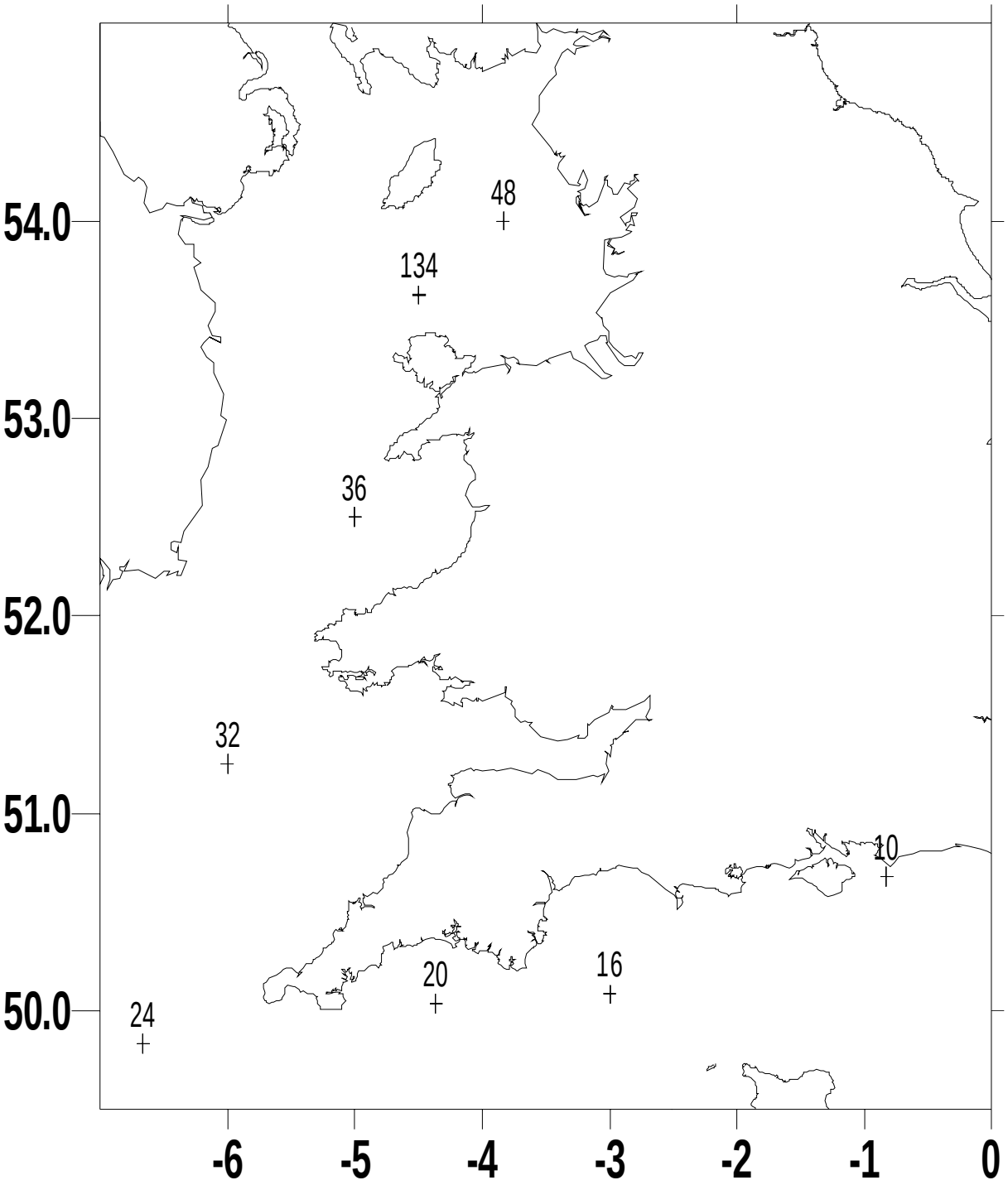
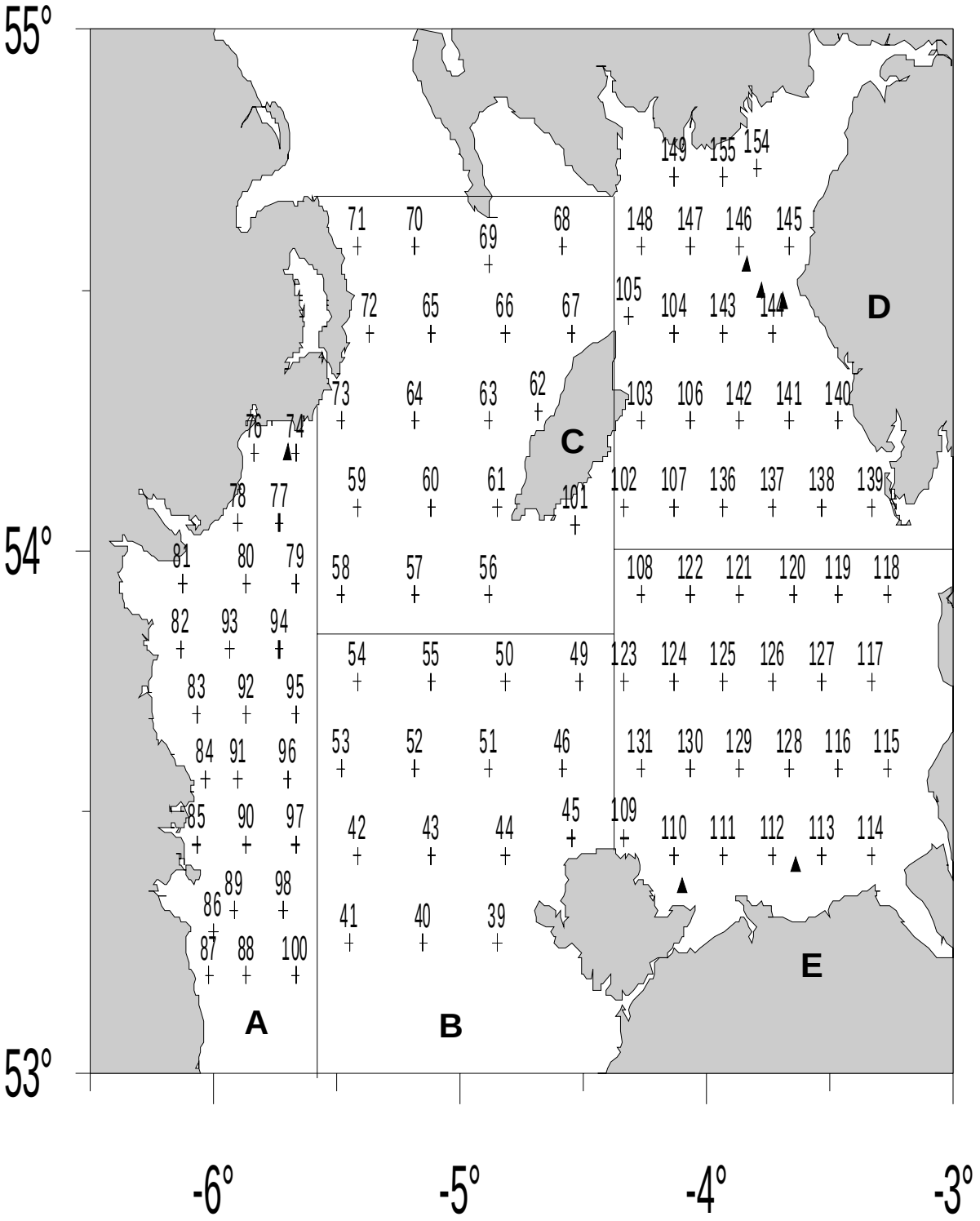


Figure 2. Irish Sea Egg Production Surveys:

C Endeavour 2/08 plankton stations, 25 Jan - 7 Feb 2008

With Strata A - E and trawl positions as black triangles



S. Milligan
Scientist In Charge
7 February 2008

SEEN IN DRAFT

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