

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

2010 RESEARCH VESSEL PROGRAMME

REPORT: RV CEFAS ENDEAVOUR: CRUISE 7/10.

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DURATION: 31 March – 9 April 2010 (All times BST)

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 aeglefinus*) 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 collect surface nutrient and salinity samples at selected plankton stations.
4. To collect surface chlorophyll samples every five sampling stations.
5. To collect supplementary sub-surface environmental data using an ESM-2 self-logging package mounted on the Gulf VII plankton samplers.
6. To collect fine mesh (80 micron) PUP net samples for subsequent zooplankton analysis on every Gulf VII deployment.
7. To continuously log sub-surface (3m) salinity, temperature, fluorometry and other environmental data using the 'Ferrybox'.
8. To use multi-frequency acoustics to provide information on the distribution of pelagic fish and plankton patches.
9. To recover, service and replace the Scarweather waverider buoy in Swansea Bay.
10. Calibration of the plankton sampler flow-metering system will be conducted if time allows.

NARRATIVE:

RV CEFAS ENDEAVOUR was scheduled to sail from Swansea at 08:00h 31 March. However, severe north-westerly gales delayed sailing until the early evening, when conditions had begun to moderate. This enabled gear to be rigged and tested, and station procedures to be fully explained to scientific staff before sailing. ENDEAVOUR sailed at 17:30h and steamed to the Scarweather Bank, approximately 10nmls south of Swansea, where a Waverider buoy was deployed. Unfortunately the sea conditions were not suitable to recover the original buoy, which had ceased functioning. Once the buoy deployment had been successfully completed, ENDEAVOUR began steaming towards the proposed plankton grid in the Irish Sea.

Poor progress was made overnight in a large westerly swell, but conditions slowly improved during the morning and the ship arrived at the first plankton position at the extreme south-west corner of the grid (Fig 1, Stn 2) at 13:00h 1 April. Good progress was then made working north, on short east – west transects, until all 25 stations in stratum A were completed by 22:30h 2 April.

Plankton sampling continued into stratum C, west of the Isle of Man, in fine weather. All except two stations south-east of the Isle of Man were completed in stratum C by midnight 3 April. Good progress was maintained as sampling progressed into the Solway and down the Cumbrian coast in stratum D although the wind gradually increased during the evening of 4 April. The final four stations in stratum D were completed by 07:45 5 April by which time the wind had increased to a SW gale and the swell was beginning to build. ENDEAVOUR then steamed to more sheltered waters in Liverpool Bay where sampling resumed at 13:15h, at the extreme south-east corner of the grid (Fig 1, Stn 67). Seven stations were completed before severe gale force SW winds prevented further work. Sampling was suspended at 21:30h and ENDEAVOUR dodged off the coast of Anglesey until daybreak.

Sampling resumed at 06:45h 6 April in moderating conditions. Reasonable progress was made working east back towards the Lancashire coast. The wind and swell steadily decreased during the day allowing completion of all stations in stratum E by 04:00h 7 April. The remaining two stations in stratum C (south-east of the Isle of Man) were completed during the early morning and good progress was made in fine weather as sampling began in stratum B. The final three stations on the grid were completed by 06:30h the following morning, ahead of schedule. ENDEAVOUR remained on position until slack water to enable six plankton sampler calibration tows to be carried out whilst conditions were favourable. These were successfully completed by 11:15h and passage was then made to the Scarweather Waverider buoy position off Swansea.

The ‘Spray technique’ for removal of fish eggs from plankton samples was attempted on a few samples. Unfortunately, this did not prove as effective as anticipated with many eggs remaining in the sprayed sample and significant amounts of plankton remaining with the eggs as they separated out. All equipment was then cleaned, packed and labelled ready for transportation to the Corystes for the final egg survey.

The non-functioning Waverider buoy at Scarweather bank was recovered at 13:10h, 9 Apr and ENDEAVOUR docked in Swansea at 15:45h.

RESULTS:

Aims 1 & 6:

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. 106 plankton stations were completed, covering the whole Irish Sea from 53° 00'N to 55° 00'N (Figure 1), with 270µm samples being collected on each station. The pup sampler flowmeter worked well on this cruise resulting in 104 samples being taken with the 80µm mesh net. The Valeport CTD system was controlled and logged by new Lab-view software developed by A. Emery. This software proved easy to use and is a vast improvement on the software package provided by Valeport. Enhancements have been made to this software between the surveys and it is now extremely robust and reliable.

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 537 eggs were obtained during this cruise, for subsequent species identification using a DNA technique. This was less than anticipated but most of eggs of the correct size were already in later stages of development. Figure 2 shows the distribution of the eggs removed for species identification.

Aims 3 and 4:

A total of 53 discrete sub-surface seawater samples were taken from the ships clean seawater. They were taken at every other plankton station. These samples were collected for subsequent nutrient, salinity and chlorophyll analysis back at the laboratory. In addition, 13 samples were taken for suspended load.

Aim 5:

An ESM2 environmental data logging package was mounted on the plankton sampler throughout the survey and it recorded data on every sampling occasion. These loggers record a wide range of environmental parameters (temperature, salinity, fluorescence, oxygen, turbidity and light) together with some information on Gulf VII performance (pitch and roll).

Aim 7:

The Ferrybox was run continuously throughout the cruise, logging several environmental parameters (including temperature, salinity and fluorescence) from the ships sub-surface seawater supply. Discrete samples were taken automatically every day for subsequent nutrient analysis back at the laboratory.

Aim 8:

The 38 kHz, 120 kHz and 200 kHz echo-sounders were logged almost continuously (excluding very shallow areas) during the cruise to provide information on the distribution of pelagic fish and plankton patches.

Aim 9:

A replacement Waverider buoy was deployed shortly after sailing on the Scarweather Bank south of Swansea. This buoy was found to be working perfectly within a few hours of deployment. The original Waverider buoy was recovered on the 9 April, a few hours before docking.

S. Milligan
Scientist In Charge
9 April 2010

SEEN IN DRAFT

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DISTRIBUTION:

Basic List

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Figure 1. Cefas Endeavour 7/10.

Plankton station positions

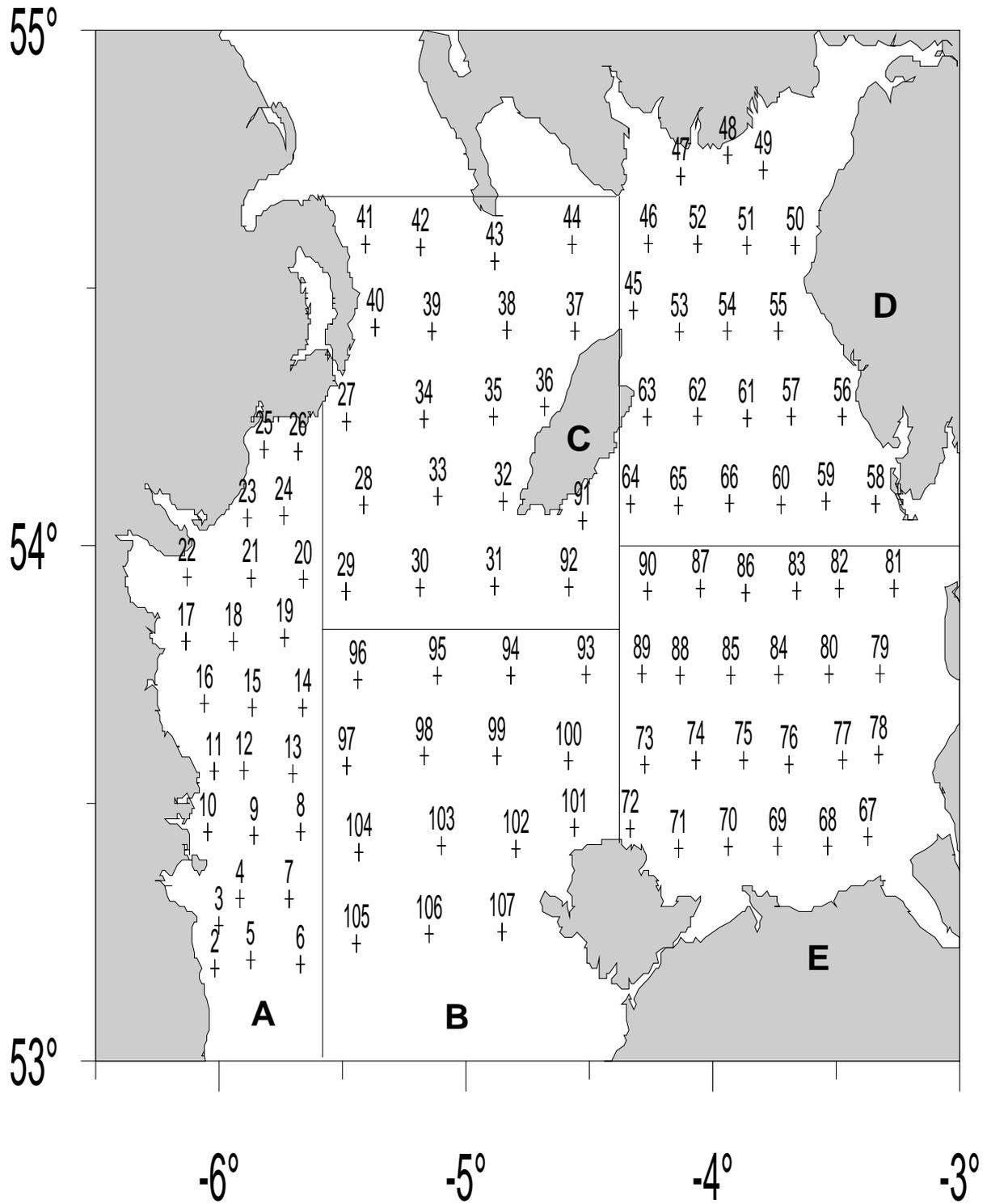


Figure 2. Cefas Endeavour 7/10.

Numbers of eggs removed for subsequent DNA identification

