

**CENTRE FOR ENVIRONMENT, FISHERIES AND AQUACULTURE SCIENCE
LOWESTOFT LABORATORY, LOWESTOFT, SUFFOLK NR33 0HT
2004 RESEARCH VESSEL PROGRAMME**

REPORT: RV CEFAS ENDEAVOUR: CRUISE 9

STAFF:

Part 1

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DURATION: 23 July – 01 August

LOCATION: Irish Sea and Celtic Sea

AIMS:

- 1) To carry out a benthic and trawl survey of mud biotopes in the Irish Sea and Celtic Sea, in support of project AE1148, and to collect data and samples for studies supporting the development of EcoQOs for benthic communities, including (a) examining the distribution, size composition, abundance and diversity of meiofauna, infauna, epibenthos and fish on mud biotopes, and (b) examining issues pertaining to relative catchability and sample replication.
- 2) To undertake sampling in support of indicators work (A0261)
- 3) To collect additional core samples from the Celtic Deep (P. Larcombe, CEFAS)
- 4) To collect biological samples of (a) *Nephrops* and other large crustaceans for laboratory analyses (K. Leonard), and (b) shrimp and other benthic fauna for the analysis of heavy metal levels (L. Newton, University of West of England)

NARRATIVE:

CEFAS ENDEAVOUR sailed from Lowestoft at 14:00 on 23 July and steamed through the English Channel on 24 July. CEFAS ENDEAVOUR arrived on site in the Celtic Deep (prime station 95 of the western groundfish survey) on the morning of 25 July, and sampling commenced at 06:55 with replicate samples of NIOZ core (ten samples), Day grab (five samples), anchor dredge (five samples), 2m steel beam trawl (five samples) and Agassiz trawl (five samples). Several commercial fishing vessels, primarily trawlers from France, Ireland and SW England, were operating in the vicinity of the study area. Quantitative field sampling with these gears was completed by 19:30, and the camera sledge was deployed at 20:10, which confirmed the nature of the habitat, with a large number of *Nephrops* burrows and occasional sea pens *Virgularia mirabilis*. That night CEFAS ENDEAVOUR steamed over the study area collecting Multibeam data.

Sampling recommenced at 06:24 on 26 July, with sampling undertaken on a grid of stations surrounding prime station 95. These stations were selected to examine spatial heterogeneity, and were sampled with Day grab (five samples) and 2m steel beam trawl (one sample). This grid comprised stations 2nm NW, NE, SE and SW of the central prime station (stations A-D respectively), and further stations approximately 6nm NW, NE, SE and SW of the prime station (stations E-H respectively). All of these stations except station G were sampled that day, with prime station 95 also sampled with 4m-beam trawl (three samples). Quantitative field sampling was completed by 20:45. At 21:20, the camera sledge was deployed again and further underwater footage of the habitat recorded. CEFAS ENDEAVOUR then steamed northwards to the second study area in the western Irish Sea.

CEFAS ENDEAVOUR arrived at the second study area (prime station 405 of the Irish Sea beam trawl survey) mid-morning on 27 July, and sampling commenced at 10:30, with five samples collected with the 2m-beam trawl. Whilst these samples were being processed, the NIOZ corer was deployed off the starboard side, but on retrieving the first sample (13:05), the cable parted just above the block. A grapnel was then deployed and the corer was snagged on the first deployment and was back on deck by 14:00. Sampling with the NIOZ corer recommenced at 15:10, though the corer was now deployed off the stern, and coring (ten samples) and grab sampling (five samples) continued that afternoon. Three tows with the 4m-beam trawl were conducted that evening, with sampling completed by 21:15, and then the camera sledge was deployed for approximately 40 minutes.

Sampling on 28 July commenced at 04:25, with three replicate samples collected with the anchor dredge on prime station 405. Following these tows, a grid of stations 2nm NW, NE, SE and SW of the prime station (stations A-D respectively), and further stations 6nm NW, NE, SE and SW of prime station 405 (stations E-H respectively) were sampled with Day grab (five samples) and 2m steel beam trawl (one sample). All eight of these stations were completed that day, and the prime station sampled with the Agassiz trawl (five samples) that evening. Camera sledge operations that night were restricted due to poor visibility at the sea floor. CEFAS ENDEAVOUR then steamed southwards to the Celtic Deep.

CEFAS ENDEAVOUR arrived at station shortly after 9am on July 29, and sampling recommenced at 09:30. A transect comprising seven stations was sampled with NIOZ core and 2m beam trawl, and the final grid station 6nm SE of prime 95 sampled with Day grab (five samples) and 2m beam trawl (one sample). The most northerly site comprised several baskets of shell-gravel, with more southerly stations becoming increasingly fine. The last 2m-beam trawl station was invalidated when the liner split and the sample was lost off the stern. That night the camera sledge was deployed and further underwater footage taken. This footage indicated that there were several *Nephrops* burrows, though no sea pens were observed. After this work was completed, CEFAS ENDEAVOUR steamed to the English Channel, arriving in Lyme Bay at 19:05 on 30 July where the camera sledge was deployed at prime station B1 of the western English Channel beam trawl survey. Afterwards CEFAS ENDEAVOUR steamed to the eastern English Channel, taking a Day grab sample off Dungeness and then steamed to Lowestoft, docking at 21:30 on July 31.

RESULTS:

Benthic and trawl survey of mud biotopes

NIOZ Corer: 27 samples were collected with the NIOZ cores, with samples taken for subsequent analysis of microbiota, meiofauna, macrofauna and PSA. Microbial and sediment samples were frozen and meio- and macrofaunal samples preserved for subsequent laboratory analysis.

Day Grab: 90 samples were collected with the Day Grab for subsequent analysis of microbiota, meiofauna, macrofauna and PSA. Microbial and sediment samples were frozen and meio- and macrofaunal samples preserved for subsequent laboratory analysis.

Anchor dredge: Eight valid tows were made with the anchor dredge, five in the Celtic Deep and three in the Irish Sea, with samples taken for the analysis of macrofauna.

Agassiz trawl: Ten valid tows were made with the Agassiz trawl, five in the Irish Sea and five in the Celtic Deep. This gear generally yielded smaller catches in comparison with the 2m beam trawl. Catches were processed at sea, with data on the abundance and biomass distribution of all non-colonial fauna, and the biomass of colonial species recorded. Catches were comprised primarily of macro-epibenthic crustaceans, including *Nephrops norvegicus*, *Goneplax rhomboides*, *Alpheus glaber* and crangonid and pandalid shrimps. Other abundant species included the bivalve *Nucula sulcata*.

2m-Beam trawl: 32 valid tows were made with the steel 2m-beam trawl: 13 in the Irish Sea and 19 in the Celtic Deep. The catch composition of invertebrates was broadly similar to that of the Agassiz trawl, though catches comprised a greater volume, and fish were more abundant in 2m-beam trawl samples. The most northerly station in the Celtic Deep transect (X1) was comprised of a large quantity of shell-gravel and this catch had a very diverse fauna (>70 species). The catch at the second station on this transect (X2) comprised 11 baskets of sand and broken shell, and once again the fauna here was very diverse. Further south along this transect, the grounds became increasingly muddy, with a less diverse fauna. The HiPap system was used to collect data on the position of the trawl, so that the time spent on the seabed could be calculated.

4m-Beam trawl: Six valid tows were made with the 4m-beam trawl, three in the Celtic Deep and three in the Irish Sea. All catches were processed at sea, with data on the abundance and biomass distribution of all non-colonial fauna, and the biomass of colonial species recorded. The length distributions of fish and *Nephrops* were also recorded. The HiPap system was used to collect data on the position of the trawl, so that the time spent on the seabed could be calculated.

Camera sledge: Five tows of the camera sledge were made on muddy habitats, though one was cut short, due to poor visibility. Sea pens and tube-forming sabellid worms were observed regularly. The camera sledge was also deployed in

Lyme Bay, at a site where large aggregations of *Serpula vermicularis* have been recorded during beam trawl surveys, though no large aggregations were observed.

Additional core sampling in the Celtic Deep

The NIOZ corer was deployed 7 times along a transect in the Celtic Deep and cores for subsequent laboratory analyses were collected. These cores ranged in length from 14-16cm in the coarser sediments in the northern part of the Celtic Deep, to 46-48cm in the muddy sediments in the southern part of the Celtic Deep.

Collection of biological samples

Samples of various crustacean species were collected from the Celtic Deep and NW Irish Sea for the analysis of contaminants. The species collected were *Nephrops norvegicus*, *Goneplax rhomboides*, *Dichelopandalus bonnieri*, *Alpheus glaber*, *Processa canaliculata*, *Crangon allmanni*, *Calocaris macandreae* and *Pontophilus spinosus*.

Sunfish and cetacean sightings

A sunfish *Mola mola* was observed at 51°26.50'N, 06°07.93'W, and was swimming at the surface of the starboard side of the vessel whilst CEFAS ENDEAVOUR was at a grab sampling station (09:30, 25 July). There were also reported sightings of a sunfish at 51°26.43'N, 06°07.97'W later that day, and at 51°24.9N, 06°10.4W on 26 July.

There were few sightings of cetaceans during the survey. A small group of unidentified dolphins were observed at 51°52.7N, 05°49.2W on the morning of 29 July, and a small group (ca. 4 individuals) of common dolphin (*Delphinus delphis*) was observed bow-riding at 51°16.7N, 06°26.1W that evening.

We thank the officers and crew for their hard work during the course of the survey

J Ellis
01 August 2004

SEEN IN DRAFT

A. Reading (Master)
A. Simpson (Senior Fishing Mate)

INITIALLED:

SI Rogers

DISTRIBUTION:

Basic list
Staff on Cruise
Stuart Rogers

Hubert Rees
Piers Larcombe
South Wales SFC

Natural History Museum, London
Andy Mackie, National Museum and
Galleries of Wales, Cardiff

Doug Herdson, National Marine
Aquarium

Table 1: Preliminary list of species recorded during the survey, and not including species preserved for subsequent identification in the laboratory.

Higher taxon	Family	Species
Porifera	Suberitidae	<i>Suberites</i> sp.
Hydrozoa	Hydractiniidae	<i>Hydractinia echinata</i>
	Sertulariidae	<i>Hydrallmania falcata</i>
	Plumulariidae	<i>Nemertesia ramosa</i>
		<i>Nemertesia antennina</i>
Anthozoa	Aglaopheniidae	<i>Lytocarpia myriophyllum</i>
	Alcyonidae	<i>Alcyonium digitatum</i>
	Virgulariidae	<i>Virgularia mirabilis</i>
	Cerianthidae	<i>Cerianthus lloydi</i>
	Caryophyllidae	<i>Caryophyllia smithi</i>
	Actiniidae	<i>Urticina</i> sp.
	Hormathiidae	<i>Adamsia carciniopados</i>
Polychaeta	Aphroditidae	<i>Aphrodita aculeata</i>
	Chaetopteridae	<i>Chaetopterus variopedatus</i>
	Sabellidae	Sabellidae (indet.)
	Serpulidae	<i>Serpula vermicularis</i>
Cirripedia	Scalpellidae	<i>Scalpellum scalpellum</i>
Isopoda	Cirolanidae	<i>Cirolana cranchi</i>
		<i>Eurydice pulchra</i>
Amphipoda	Arcturidae	<i>Astacilla longicornis</i>
	Epimeridae	<i>Epimeria conchilega</i>
	Pasiphaeidae	<i>Pasiphaea</i> sp.
	Alpheidae	<i>Alpheus glaber</i>
	Processidae	<i>Processa canaliculata</i>
	Pandalidae	<i>Dichelopandalus bonnierii</i>
		<i>Pandalus</i> sp.
	Crangonidae	<i>Crangon allmanni</i>
		<i>Pontophilus spinosus</i>
	Nephropidae	<i>Nephrops norvegicus</i>
	Axiidae	<i>Calocaris macandreae</i>
	Paguridae	<i>Anapagurus laevis</i>
		<i>Pagurus bernhardus</i>
		<i>Pagurus prideaux</i>
Decapoda	Galatheididae	<i>Galathea</i> sp.
		<i>Munida rugosa</i>
	Leucosiidae	<i>Ebalia cranchii</i>
		<i>Ebalia granulosa</i>
		<i>Ebalia tuberosa</i>
		<i>Ebalia tumefacta</i>
	Majidae	<i>Hyas coarctatus</i>
		<i>Inachus dorsettensis</i>
		<i>Inachus leptochirus</i>
		<i>Macropodia rostrata</i>
		<i>Macropodia tenuirostris</i>
	Corystidae	<i>Corystes cassivelaunus</i>
	Atelecyclidae	<i>Atelecyclus rotundatus</i>
	Cancridae	<i>Cancer pagurus</i>
	Portunidae	<i>Liocarcinus depurator</i>

		<i>Liocarcinus holsatus</i>
		<i>Liocarcinus pusillus</i>
		<i>Monodaeus couchi</i>
	Xanthidae	<i>Goneplax rhomboides</i>
	Goneplacidae	<i>Pycnogonum littorale</i>
Pycnogonida	Pycnogonidae	<i>Calliostoma granulatum</i>
Gastropoda	Trochidae	<i>Turritella communis</i>
	Turritellidae	<i>Aporrhais pespelecani</i>
	Aporrhaidae	<i>Aporrhais serresianus</i>
		<i>Polinices fusca</i>
	Naticidae	<i>Buccinum undatum</i>
	Buccinidae	<i>Colus gracilis</i>
		<i>Neptunea antiqua</i>
Opisthobranchia	Arminidae	<i>Armina loveni</i>
	Dendronotidae	<i>Dendronotus frondosus</i>
Bivalvia	Nuculidae	<i>Nucula sulcata</i>
	Pectinidae	<i>Aequipecten opercularis</i>
		<i>Palliolium tigrinum</i>
	Arctidae	<i>Arctica islandica</i>
	Glossidae	<i>Glossus humanus</i>
	Cardiidae	<i>Acanthocardia echinata</i>
	Veneridae	<i>Clausinella fasciata</i>
		<i>Chamelea gallina</i>
		<i>Circomphalus casina</i>
		<i>Timoclea ovata</i>
	Mactridae	<i>Spisula</i> sp.
	Scrobiculariidae	<i>Abra</i> spp.
	Solenidae	<i>Phaxas pellucidus</i>
Cephalopoda	Sepiolidae	<i>Sepiola atlantica</i>
		<i>Rossia macrosoma</i>
	Loliginidae	<i>Alloteuthis subulata</i>
	Octopodidae	<i>Eledone cirrhosa</i>
Bryozoa	Flustridae	<i>Flustra foliacea</i>
	Bugulidae	<i>Bugula</i> sp.
	Cellaridae	<i>Cellaria</i> sp.
	Alcyoniidae	<i>Alcyonidium diaphanum</i>
Echinodermata	Antedonidae	<i>Antedon bifida</i>
	Astropectinidae	<i>Astropecten irregularis</i>
	Luidiidae	<i>Luidia sarsi</i>
	Solasteridae	<i>Crossaster papposus</i>
	Echinasteridae	<i>Henricia oculata</i>
		<i>Stichastrella rosea</i>
	Asteriidae	<i>Asterias rubens</i>
	Ophiolepidae	<i>Ophiura albida</i>
		<i>Ophiura ophiura</i>
	Ophiotrichidae	<i>Ophiothrix fragilis</i>
	Amphiuridae	<i>Amphiura</i> sp.
	Echinidae	<i>Psammechinus miliaris</i>
		<i>Echinus acutus</i>
	Fibulariidae	<i>Echinocyamus pusillus</i>
	Spatangidae	<i>Spatangus purpureus</i>
		<i>Brissopsis lyrifera</i>

Tunicata	Asciidiidae	<i>Echinocardium</i> sp. <i>Asciidiella aspersa</i> <i>Asciidiella scabra</i>
Elasmobranchii	Scyliorhinidae	<i>Scyliorhinus canicula</i>
Teleostei	Argentinidae	<i>Argentina</i> spp.
	Gadidae	<i>Gadus morhua</i> <i>Merlangius merlangus</i> <i>Micromesistius poutassou</i> <i>Melanogrammus aeglefinus</i> <i>Trisopterus esmarki</i> <i>Trisopterus minutus</i> <i>Phycis blennioides</i> <i>Molva molva</i> <i>Enchelyopus cimbrius</i>
	Merluccidae	<i>Merluccius merluccius</i>
	Lophiidae	<i>Lophius piscatorius</i>
	Triglidae	<i>Eutrigla gurnardus</i>
	Agonidae	<i>Agonus cataphractus</i>
	Callionymidae	<i>Callionymus lyra</i> <i>Callionymus maculatus</i>
	Gobiidae	<i>Crystallogobius linearis</i> <i>Pomatoschistus</i> sp.
	Scophthalmidae	<i>Lepidorhombus whiffiagonis</i>
	Pleuronectidae	<i>Glyptocephalus cynoglossus</i> <i>Hippoglossoides platessoides</i> <i>Limanda limanda</i> <i>Pleuronectes platessa</i>
	Soleidae	<i>Buglossidium luteum</i> <i>Microchirus variegatus</i> <i>Solea solea</i>

Figure 1: Primary sampling stations in the Irish Sea (405), Celtic Deep (95) and additional stations in the Celtic Deep sampled with NIOZ core and 2m-beam trawl (X1-X7)

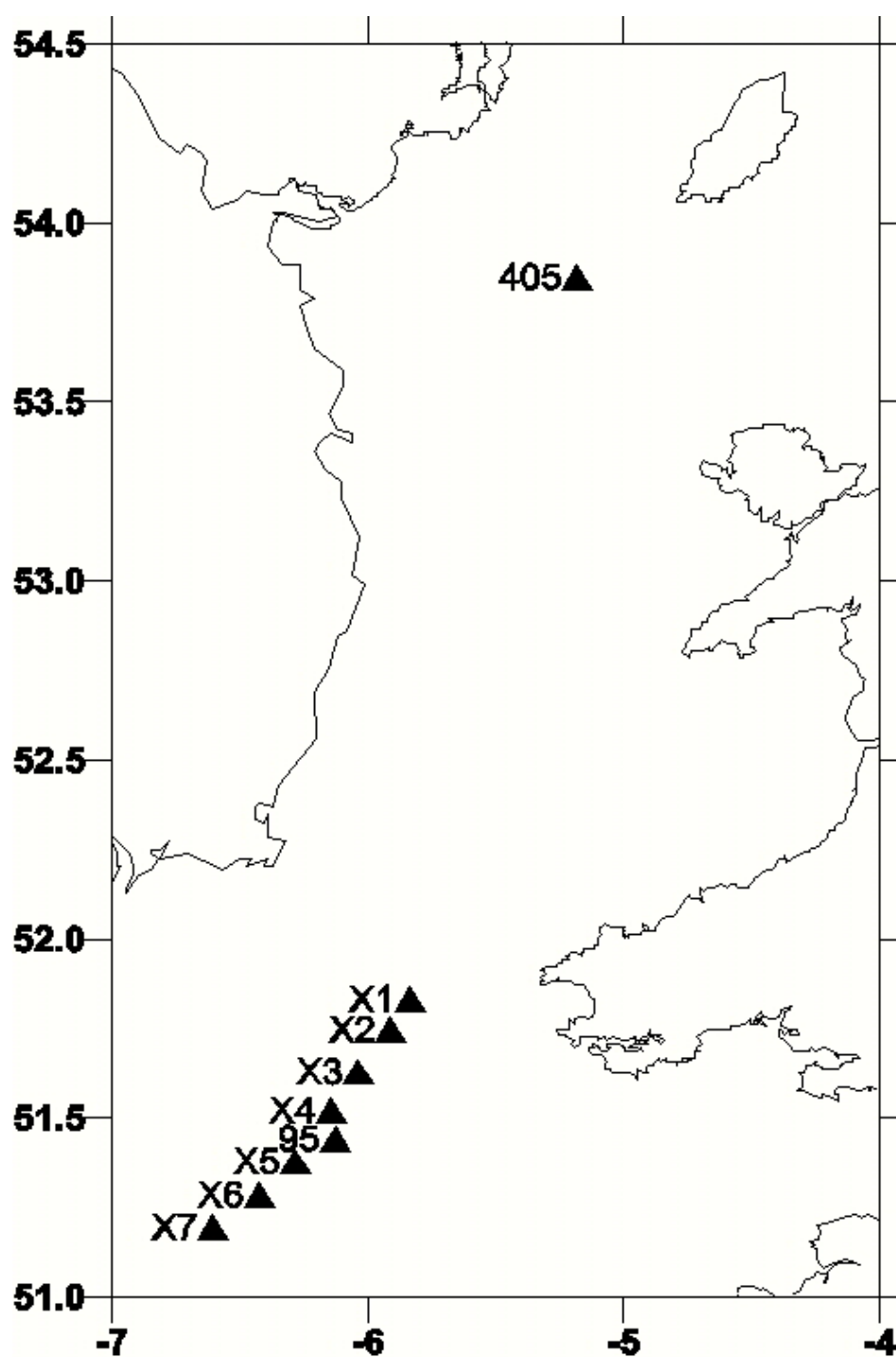


Figure 2: Sampling grids conducted around the primary survey stations in the Celtic Sea (top) and Irish Sea (bottom).

