

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

**2005 RESEARCH VESSEL PROGRAMME**

REPORT: RV CEFAS ENDEAVOUR 17/05

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DURATION: 24<sup>th</sup> October – 4<sup>th</sup> November 2005

LOCATION: Western English Channel (Vlle)

AIMS:

1. To carry out a survey of scallops (*Pecten maximus*) in an area of the western English Channel (Vlle) to quantify sampling and spatial variability of scallop size and age structures in dredge catches.
2. To characterise sediment types at scallop survey stations using a remote acoustic seabed discrimination system (swathe bathymetry & QTC).
3. To collect data on fish by-catch and epibenthos in scallop dredges.

ADDITIONAL AIMS:

4. To collect and preserve samples of edible crab tissue for genetic studies to be carried out under contract C2298.
5. To collect water samples from the ships supply for the Defra funded AE001 project (Provision of Advice in Relation to Radiological Matters). Two x 25 litre carboys (for <sup>137</sup>Cs analysis) and one x 1 litre polybottle (for <sup>3</sup>H analysis) with seawater from the ships supply will be collected at each of 10 stations.

NARRATIVE (all times in GMT):

CEFAS ENDEAVOUR departed from Lowestoft at 2300 on Sunday 23<sup>rd</sup> October. Strong SW winds and poor sea conditions in the English Channel meant progress was slow and shelter was sought in Lyme Bay to complete the gear rigging and make the first deployment (50° 38' N 3° 14' W) at 1156 on Tuesday 25<sup>th</sup> October.

Eight spring-loaded scallop dredges were deployed, each fitted with 'French'-style tooth bars at a tension of 10m.kg – the gear configuration for soft (sandy) ground. The survey continued working into the more exposed waters, making a total of 42 deployments and obtaining data on the 37 of the 39 'soft ground stations by Friday 28<sup>th</sup> October. All tows were of 15 minute duration at 2.5-3.0kts.

The gear was re-configured for 'hard ground' before the next station – tooth bars with 5" round (peg) teeth at a tension of 6m.kg. This configuration was first deployed at 1539 on Friday 28<sup>th</sup> October on clear ground (50° 13' N 4° 27' W), just west of the station where the starboard dredges and towing beam were lost last year. This

station and the following 3 stations along the Cornish coast were completed without major incident.

On the morning of Saturday 29<sup>th</sup> October the gear was deployed just south of the Lizard (StnRef 26, 49° 56' N 5° 14' W) and pinnacles encountered before completion of the tow. The gear was recovered with the port side beam severely bent and the lifting bar of one dredge bent. The starboard beam was also very slightly damaged, but was still usable. Despite the damage, the dredges on both beams were relatively full (of stones) with no scallops present. Last years survey also recorded no scallops at this station and taking into account the damage sustained this year and the quite high amounts of static gear in the area, excluding this station from future surveys should be considered.

The port beam was replaced before the next tow and the dredge with the damaged lifting bar after the following tow, when it became clear that it was catching less than the others on that beam. In worsening weather conditions one further scallop station was surveyed and a water sample taken at 1115 (Aim 5) after which, with southerly winds gusting to 50kts, Capt. McCurry took the decision to suspend fishing activity and take shelter off St. Ives.

CEFAS ENDEAVOUR returned to the survey grid for the morning of Monday 31<sup>st</sup> October commencing fishing at 0730. Heavy swells and high winds made conditions difficult, but they improved during the day. During Monday and Tuesday 19 stations were surveyed until imminent force 10 SE gales forced the curtailment of fishing activity at 1700 on Tuesday 1<sup>st</sup> November. Shelter was sought in Mullion Cove, with the ship later moving to south of Penzance as the wind veered to the SW.

After some inspections of the ship's hydraulics on Wednesday morning, CEFAS ENDEAVOUR returned to the survey grid making slow progress into heavy southerly seas. Two stations were surveyed before in freshening force 8 winds fishing was again curtailed at 1600. Severe gales were forecast for Wednesday night and Thursday, and returning to shelter overnight would not allow sufficient time to return to the grid and carry out any tows on Thursday morning. There was, therefore, no prospect of carrying out any further fishing and it was decided to steam south to a water station and then collect the remaining two water stations during the return steam to Lowestoft.

Three water samples were successfully collected at 1910 and 2246 on Wednesday and 0454 on Thursday before the vessel continued eastward to the Dover Straits then northwards, arriving at Lowestoft at 0930 on Friday 4 November.

## RESULTS:

### Aim 1

The scallop survey grid was not completed during the cruise. Winds of, or in excess of, gale force (8) from the SE to SW quarter were experienced in the fishing area on 8 days of the 10 days available for fishing. This severely curtailed scallop surveying opportunities, but nonetheless a total of 71 tows were achieved at 64 sampling positions (Figure 1). This was the first time scallop gear has been used on CEFAS ENDEAVOUR and impressions were generally favourable. The vessel was able to fish in heavier weather than RV Corystes and the procedures for recovery and emptying of the dredges were both quicker and safer than on RV Corystes.

There was a problem with turning the dredges over, particularly the starboard set, during shooting in moderate to heavy weather, but this seemed to be improved by shooting at faster speed. It was also difficult to maintain steerage at the planned towing speed of 2.5kts and towing speeds well in excess were realised when towing with the weather in poor conditions.

Catches were generally lower than in last year's survey which was to be expected given the weather conditions. Average catch rate was 23.4 scallops per tow, with higher catch rates on the hard than the soft ground (Table 1). About 90% of the scallops were of commercial size ( $\geq 90$  mm shell height), the proportion being slightly higher on the soft (97%) than the hard ground (89%). Mean shell height was 104.5mm on the soft ground and 94.4mm on the hard ground. As last year highest catch rates (peak 167 scallops per tow) were recorded on the Cornish inshore grounds (Figure 1), including good numbers of pre-recruit size-classes. More than 1600 scallops were captured during the survey. Shell heights were measured and the flat shells were retained for later age-determination in the laboratory.

### Aim 2

Multibeam swathe bathymetry equipment was inoperable despite the best efforts of SIGS prior to the cruise.

The QTC ground discrimination system was run for all stations and for transits between stations. The system was run for a depth range of 10-100m from 0600 on Tuesday 25<sup>th</sup> October until operations ceased on Saturday 29<sup>th</sup> October. Taking account of problems noted for depths greater than 100m last year, the depth range was increased to 35-135m at 0800 on Sunday 30<sup>th</sup> November and these settings retained for the remainder of the cruise. The purpose of the QTC calibration readings was to provide an improved basis for spatial interpolation of scallop densities across the western Channel grounds.

### Aim 3

Qualitative abundance scores were recorded at each scallop survey station for 38 separately identified taxa of benthos (Table 2). Echinoderms, crustacea and molluscs were the most consistently recorded groups. Multivariate analysis may provide a basis for classification of community type. Some physical characteristics of the dredge contents were also recorded qualitatively (dredge fullness, rocks, stones and dead shells).

A total of 12 fish species, 2 cephalopod species and 2 commercial crustacean species were identified in the dredge contents (Table 3). The commercial fish species were measured, and maturity stage recorded and otoliths retained for sole, plaice and anglerfish. The most consistently occurring by-catch species were edible crabs, cuttlefish, spider crabs and anglerfish. Three species of rays were recorded, together with 6 species of flatfish.

### Aim 4

The bad weather meant that few tows were carried out in the area from which crabs were required for genetic studies and insufficient crabs were captured to provide a useful sample. No berried crabs were captured.

#### Aim 5

Water samples for Caesium analysis were successfully collected at nine stations, the only omission being a station in French waters, well to the south of the survey grid.

#### **Acknowledgements**

As always it was a pleasure to be with the officers and crew of RV CEFAS ENDEAVOUR and their professionalism must be acknowledged. Their support and flexibility in working scallop gear for the first time on this vessel in what frequently turned out to be very difficult conditions contributed greatly to maximising what could be achieved.

M T Smith

4 November 2005

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TABLE 1. Catch rates of scallops in the western English Channel.

(a) Catch per 15 minute tow

Ground type	N	Average	SD	Maximum
Hard	33	44.2	43.6	167
Soft	33	6.1	8.8	39
Total	66	25.2	36.6	167

(b) Catch per dredge km

Ground type	N	Average	SD	Maximum
Hard	33	4.1	4.0	16
Soft	33	0.7	1.0	4
Total	66	2.4	3.4	16

TABLE 2. Species recorded in the scallop dredge catches

Group	Species	Total of abundance scores	Proportion of scallop stations where present %
<b>Echinodermata</b>	<i>Astropecten irregularis</i>	18	25
	<i>Luidia sarsi</i>	5	6
	<i>Luidia ciliaris</i>	24	32
	<i>Porania pulvillus</i>	6	7
	<i>Anseropoda placenta</i>	1	1
	<i>Crossaster papposus</i>	4	6
	<i>Asterias rubens</i>	32	40
	<i>Marthasterias glacialis</i>	29	31
	<i>Ophiura ophiura</i>	1	1
	<i>Psammechinus miliaris</i>	3	4
	<i>Echinus esculentus</i>	16	19
	<i>Spatangus purpureus</i>	2	3
	<i>Stichastrella rosea</i>	4	6
	<b>Mollusca</b>	<i>Pecten maximus</i>	104
<i>Aeqipecten opercularis</i>		12	15
<i>Astarte sulacata</i>		1	1
<i>Artica islandica</i>		2	3
<i>Glycimeris glycimeris</i>		3	3
<i>Crepidula fornicata</i>		8	7
<i>Clamys varia</i>		1	1
<i>Ostrea edulis</i>		2	1
<i>Sepia officinalis</i>		23	32
<i>Elodone cirrhosa</i>		8	12
<b>Crustacea</b>		<i>Pagurus spp.</i>	3
	<i>Maja squinado</i>	31	29
	<i>Cancer pagurus</i>	36	49
	<i>Liocarcinus depurator</i>	1	1
	<i>Galathea sp.</i>	1	1
	<i>Inachus dorsettensis</i>	3	4
<b>Bryozoa</b>	Unidentified	1	1
	<i>Flustra foliacea</i>	1	1
<b>Hydroids</b>	<i>Nemertesia spp.</i>	16	18
	<i>Sertularia spp.</i>	6	6
	Unidentified	3	4
	<i>Cellaria sp.</i>	1	1
<b>Ascidia</b>	Unidentified	2	3
<b>Polychaeta</b>	<i>Chaetopterus variopedatus</i>	9	13
<b>Anthozoa</b>	<i>Alcyonium digitatum</i>	14	15
<b>Teleosta</b>	<i>Pleuronectes platessa</i>	7	10
	<i>Solea solea</i>	9	13
	<i>Scophthalmus rhombus</i>	1	1
	<i>Scophthalmus maximus</i>	2	3
	<i>Microstomus kitt</i>	2	3
	<i>Lepidorhombus whiffiagonis</i>	5	7
	<i>Lophius piscatorius</i>	18	25
	<i>Zeus faber</i>	1	1
	<i>Trisopterus luscus</i>	1	1
<b>Elasmobranchia</b>	<i>Raja clavata</i>	1	1
	<i>Raja naevus</i>	4	6
	<i>Raja montagui</i>	1	1

TABLE 3. Commercial species recorded in scallop dredge catches

Species	Total number caught	% occurrence	Mean number per tow	Maximum number per tow
<i>Pecten maximus</i>	1660	78	24.41	167
<i>Sepia officinalis</i>	29	32	0.43	3
<i>Elodone cirrhosa</i>	9	12	0.13	2
<i>Maja squinado</i>	68	29	1.00	16
<i>Cancer pagurus</i>	48	49	0.71	4
<i>Pleuronectes platessa</i>	8	10	0.12	2
<i>Solea solea</i>	9	13	0.13	1
<i>Scophthalmus rhombus</i>	1	1	0.01	1
<i>Scophthalmus maximus</i>	2	3	0.03	1
<i>Microstomus kitt</i>	2	3	0.03	1
<i>Lepidorhombus whiffiagonis</i>	7	7	0.10	2
<i>Lophius piscatorius</i>	22	25	0.32	3
<i>Zeus faber</i>	1	1	0.01	1
<i>Raja clavata</i>	2	1	0.03	2
<i>Raja naevus</i>	4	6	0.06	1
<i>Raja montagui</i>	1	1	0.01	1

FIGURE 1. Station positions and catch rates of scallops in the western English Channel. Circle area is proportional to catch rate. Superimposed circles of different sizes indicate port and starboard samples differing in catch rate

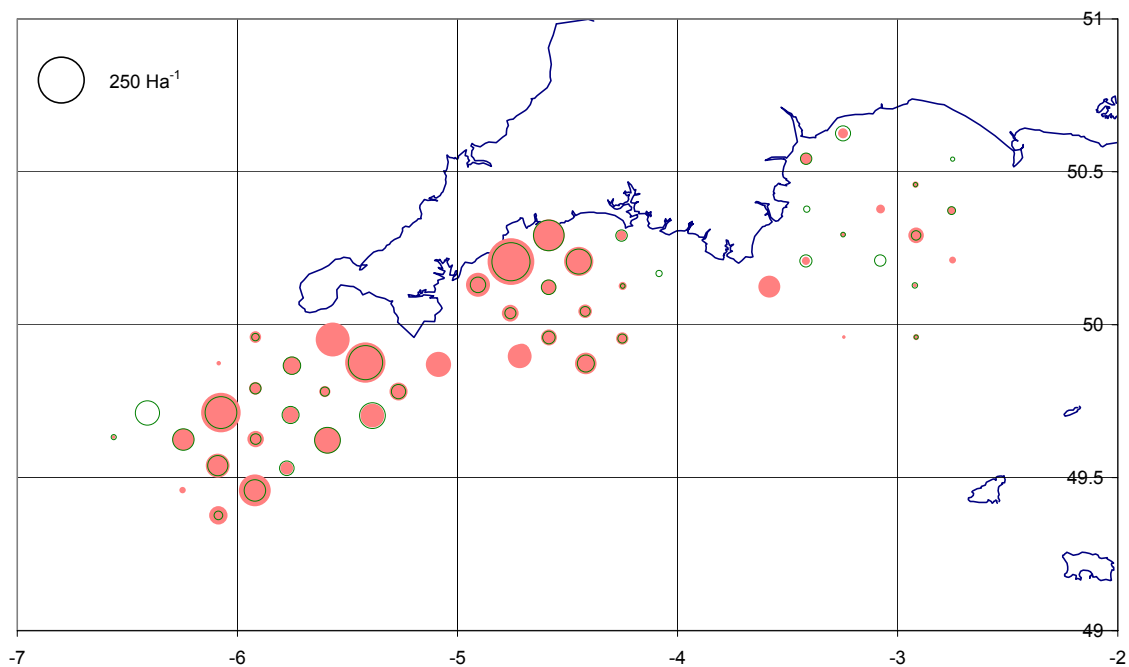


FIGURE 2. Size-frequency distributions of scallops caught on 'soft' and 'hard' ground in the western English Channel

